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## DISEASES CAUSED BY BACTERIA AND FUNGI

LURIA, S. E. (1946.) A test for penicillin sensitivity and resistance in *staphylococcus*.—*Proc. Soc. exp. Biol., N.Y.* **61**. 46-51. **828**

By plating suitable numbers of bacteria in agar containing penicillin, plates with the same concentration of penicillin and with different inocula gave counts proportional to the size of the inoculum; this growth was believed to be due to resistant variants of a normally sensitive strain. With large inocula growth might occur even with high concentrations of penicillin, the amount of growth being no longer proportional to the size of inoculum; this type of growth was said to be due to the production of a penicillinase capable of destroying penicillin. A test for penicillin resistance is described. Broth culture is used with different concentrations of penicillin and also with different sizes of inoculum, the results being read after 24 or 48 hours' incubation.

—R. MARSHALL.

HÜLPHERS, G., & LILLEENGREN, K. (1945.) Om stafylokokksjuka, pseudotuberkulos och pasteurellos hos villebråd. [*Staphylococcus infection, pseudotuberculosis and pasteurellosis in game.*]—*Svenska Jägareförb. Meddel.* **10**. pp. 3-54. [English summary.] Reprinted in *Medd. Veterinär-högsk. Stockh.* **19**. (1945.) **829**

Forty cases of acute septicaemic and chronic pyaemic staphylococcal infection in hares were met at P.M. examinations. Gross abscesses are usually found subcutaneously at the supposed primary site of cutaneous infection, and also in one or more internal organs or musculature including the heart and pericardium.

Staphylococcal infection was a cause of death in capercailzie, blackcock, partridges and mallards, usually as an acute disease without gross lesions. Leg joint infection was a feature of more chronic cases.

Fifteen cases of pseudotuberculosis in hares occurred (*Past. pseudotuberculosis rodentium* infection), both of acute or chronic types. There was

one case of this disease in a roe deer; also a few cases in partridges, capercailzie, blackcock and hazel grouse, the course in birds usually being acute.

Twelve cases of pasteurellosis occurred in hares.—J. E.

LANCEFIELD, R. C., & DOLE, V. P. (1946.) The properties of T antigens extracted from Group A hemolytic streptococci.—*J. exp. Med.* **84**. 449-471. **830**

L. discusses the M and T antigens of haemolytic streptococci, showing that among the several types the differing M and T antigens vary independently. The T antigen may be present or absent in strains of any given type but it is stable. The M antigen is easily lost by strains in which case the colony form changes from the matt to the glossy form. T antigens have not previously been obtained in extracts from streptococci whereas M antigens are easily obtained in soluble form.

A method is described for the isolation of the T antigen from type 1 strains of group A streptococci. Both M and T antigens are proteins and their chemical, physical and physiological properties are compared. Living or heat-killed streptococci when digested by proteolytic enzymes have their M antigen destroyed within two hours whereas the T antigen remains in the cells for three or more hours and when eventually released in its soluble form it is resistant to prolonged digestion by pepsin, trypsin, ribonuclease and streptococcal proteinase.

Precipitin tests (in capillary tubes) and complement fixation tests with the soluble T antigens revealed their specificity and the results agreed with the typing of their parent strains by means of agglutination tests. Although the soluble T antigen is highly antigenic, the antibody is non-protective, whereas the M antibody confers type-specific protection.—J. KEPPIE.

MENON, K. A. P. (1947.) Anthrax among cattle

a clinical investigation of an outbreak with special reference to the subacute form.—*Indian vet. J.* 24. 56-59. 831

An outbreak of anthrax involved some 29 cattle during June and July in Madras Presidency, chiefly in bulls and working bullocks; no cases occurred in buffaloes, sheep or goats. The symptoms were mainly abdominal in origin, with recurrent tympany and straining. The illnesses lasted for 24 hours to four days before death or recovery, and the author comments on this unusual length.—F. C. MINETT.

SUTTON, G. D. (1947.) Avirulent anthrax vaccine.—*J. S. Afr. vet. med. Ass.* 18. 79-81. 832

Modifications made to overcome difficulties encountered in the production of this vaccine are described. As the strain used loses its immunogenic capacity when stored on media, it has to be dried *in vacuo* from the frozen state, and stored in sealed ampoules. For this operation the culture is suspended in brewer's yeast extract or nutrient broth, as physiological saline affects the strain adversely. A better vaccine is produced by using tryptic digest casein in place of proprietary brands of casein, some of which proved unsatisfactory. The medium now used is described.

Details of the technique of the preparation of the vaccine are given, and also the routine test to which it is subjected using g. pigs, goats and cattle as test animals.—U. F. RICHARDSON.

SMITH, N. R. (1947.) The identification of sporeforming bacteria isolated from incompletely sterilized agar.—*J. Bact.* 53. 45-48. [Author's summary copied verbatim.] 833

A study of 28 cultures of sporeforming bacteria previously isolated by Townsend and Zuch [see *V.B.* 15. 62] from contaminated agar and vaccines resulted in the following identifications: *Bacillus subtilis*, 14 cultures; *B. pumilus*, 5; *B. megatherium*, 4; *B. firmus*, 1; *B. latus*, 1; *B. circulans*, 1; and *B. brevis*, 1. One unidentified culture belongs to a group intermediate between the mesophiles and the thermophiles, a group that has not been described adequately.

The absence of true thermophiles and the repeated occurrence of *B. subtilis* among these cultures are especially noteworthy.

For determining the maximum temperatures of growth, it is recommended that cultures be incubated in a water bath for temperatures above 37°C and that the medium be brought up to the same temperature before inoculation.

I. ELIZALDE, P. I., MONSERRAT, J. L., & ANCHEZAR, B. (1944.) Tuberculosis experimental y desensibilización con histamina y con tuberculina. Evolución del complejo primario cutáneo

y pulmonar. [Histamine and tuberculin desensitization.]—*Rev. Asoc. méd. argent.* 58. 125-132. 834

II. ELIZALDE, P. I., ITOIZ, O. A., & ANCHEZAR, B. (1944.) Tuberculosis experimental y desensibilización tuberculinica. [Tuberculin desensitization.]—*Ibid.* 58. 165-173. Discussion pp. 173-174. 835

I. The authors planned a series of experiments involving specific desensitization of tuberculous g. pigs by tuberculin and non-specific "desensitization" by histamine, in order to find out the part played by histamine in the phenomena of tuberculous inflammation. Sixty-six g. pigs were divided into three groups (21, 15 and 30) and injected with virulent human tubercle bacilli subcutaneously, intratracheally and intravenously, respectively. Each group was subdivided into three lots, the first being controls, the second treated with histamine and the third with tuberculin. Results from the subcutaneously infected group were classified as follows.

In the group "desensitized" with histamine and with tuberculin, there was a marked delay in the formation of nodules and ulcers at the site of inoculation, and in the growth and caseation of local lymph nodes, as compared with the controls. The ulcer at the site of inoculation remained open until death in the controls. In the g. pigs treated with tuberculin the ulcer closed and formed a cyst within a caseous nodule. In those treated with histamine, it closed, and healed over with fibrous tissue.

The same general features were found in the g. pigs infected *via* the trachea and the blood-stream. Lung lesions and glandular involvement were less pronounced in the "desensitized" groups than in the controls.

Throughout the tests, the animals were examined for sensitivity to tuberculin. The Mantoux test showed efficient desensitization by tuberculin, but the animals treated with histamine became slightly more sensitive to tuberculin than the controls. Sensitivity developed first in the g. pigs infected intratracheally, then in those infected subcutaneously, and lastly in the intravenous group.

II. Five groups of five g. pigs were used. The first group was infected with tubercle bacilli, desensitized with crude tuberculin, and reinfected four months after primary infection. The second group was used to study the effects of primary and secondary infections with tubercle bacilli, without tuberculin treatment. The third and fourth groups were used as controls of the virulence of the first and second injections of tubercle bacilli in the first, second and fifth groups. The fifth group was used to determine the effect

of treatment with tuberculin on subsequent tuberculous infection.

Tuberculin treatment in the first and fifth groups consisted of daily injections of increasing doses of crude tuberculin.

Weights of the infected animals fluctuated rather unaccountably, but all dropped suddenly before death. One of the most marked results of the experiments was the closing of the ulcer at the site of inoculation in animals of the first group, nine days after tuberculin treatment. In this group, the intradermal tuberculin test became negative after 45 days. P.M. examinations showed the tuberculin treatment to have a bacteriostatic effect in the infected animals. Infection was almost confined to the regional lymph nodes. Visceral lesions, in the form of hyaline micro-nodules, were found only on microscopical examination.

Following secondary infection, injection ulcers in tuberculinized animals healed ten days before those of the controls, in the second group.

The authors attribute the scarcity of macroscopic visceral lesions in the first group to desensitization and not to any direct action by tuberculin. They support this view by the results obtained in the fifth group, in which tuberculin treatment preceded infection, and yet failed to impede the progress of the disease.

In the discussion, A. E. Bianchi summarized the above findings by saying that tuberculous g. pigs desensitized by tuberculin have not lost their allergy (since, he believes, allergy is not synonymous with sensitivity). Tuberculous animals, following desensitization, are not immune to reinfection, but have an increased resistance to it, and this latter constitutes their allergy. "Allergy is equal neither to hypersensitivity nor to immunity." —I. W. JENNINGS.

SCHMID, G., & KUNCAITIS, J. (1947.) Experimentell-praktische Erfahrungen in der Bekämpfung der Rindertuberkulose. [The control of bovine TB.]—Schweiz. Arch. Tierheilk. 89. 159-166. 836

In order to detect open cases among tuberculin reactors which were not clinically distinguishable g. pigs were inoculated with sputum and milk samples. Repeated samples of sputum are often necessary. Preliminary treatment of the sputum samples with 4% potassium bichromate for 24 hours at 37°C. is carried out; sulphuric acid is not used. Every sputum sample is centrifuged for 30 min. at 4,500 revolutions per min. Simultaneously with the sputum or milk the g. pig is injected at another part of the body with a 20% solution of irgamid (a sulphanilamide derivative) which keeps 95% of them alive.

In one area 1,682 sputum samples were

examined of which 247, 14.6%, were positive. From 152 mixed herd milk samples only two, 1.3%, were positive, both cases of udder TB. Autopsy of 169 animals showed 37% lesions of the chest and the abdomen, 57% of chest only, one case of pharyngeal TB. and one of TB. of the lymph nodes only, whilst four animals were apparently negative.

In a second area 307 sputum samples were examined of which 25% were positive. Only two mixed herd milk samples out of 86 farms were positive. Out of 36 single samples from suspected udders five were positive. At the autopsy of 29 animals 20 had chest lesions, nine lesions in chest and abdomen.

The increasing incidence of open lesions with rising age indicates that healing of existing lesions is very probable.—C. AHARONI.

BALMER, S. (1947.) Ueber die staatliche Bekämpfung der Rindertuberkulose in der Schweiz. [State control of bovine tuberculosis in Switzerland.]—Inaug. Diss., Bern. pp. 76. 837

In 1944, 64% of the cattle population was insured, and 25-35% of the claims were for clinical TB. cases.

From 1934 onwards tuberculin testing was introduced and at the end of 1945, 22,000 herds with 182,000 cattle were free of TB. infection. The incidence varies, but 50-60% reactors in a herd frequently occur. Financial help is given for improvements of buildings, etc.

As thorough isolation of reactors in the predominantly small herds is practically impossible, and as 40% of the slaughtered reactors show only lymphatic, but no organic lesions, a large-scale field experiment has been initiated in order to utilize reactors as long as possible. Regional offices for the exchange of reactors have been established which after a strict examination take over non-clinical reactors from herds which are in the process of clearing-up; the office puts these reactors in infected commercial herds. These animals stand under strict veterinary control, are permanently marked and cannot be sold again.

This system has been in existence in Graubünden for seven years in which time 1,181 animals were transferred, 73% of which still were alive at the end of 1945. 272 had been slaughtered and at their autopsy 40% showed open lesions, 33% closed lesions in lymph nodes only, 18% no evidence of TB. and 9% other diseases.

Important savings in milk production and expenditure can thus be made without impeding the general progress of the eradication of bovine TB. For the success of the scheme a careful preliminary examination of the animals concerned and exchange offices that work smoothly and quickly are all-important.—C. AHARONI.

ANDRES. (1945.) Durchführung und Beurteilung der intrakutanen Tuberkulinprobe im staatlichen Verfahren zur Bekämpfung der Rindertuberkulose. [The intracutaneous tuberculin test in the control of bovine TB.]—Schweiz. Arch. Tierheilk. **87.** 119-136. 838

The present regulations for the intracutaneous tuberculin test in Switzerland are discussed in detail. Advice is given on technique, dosage, the type of reaction and how to assess the reaction. Details are given of the action to be taken when positive reactions occur in herds considered to be free from TB. and the use of tests with human type and of avian type tuberculins. The increase in the thickness of the skin fold should not be considered the major factor in assessing the reaction; the local and general reactions are even of greater importance for the evaluation of the results. All tuberculin tested animals should also be given a clinical examination.—E. KLIENECKER-NOBEL.

COPPER, H. J., & CLARK, C. (1946.) Retardants to the growth of tubercle bacilli. The effect of caramelization on growth.—Amer. Rev. Tuberc. **54.** 179-182. [Spanish summary.] 839

For the diagnosis of TB. by culture on egg medium the eggs used must be fresh and the medium should be autoclaved.

Free fatty acids have an inhibitory effect on growth and they are present in larger quantities in old eggs. Medium prepared from old eggs is less easily sterilized. To obtain good growth it is essential that the composition of the medium is not materially altered by the process of sterilization.—A. A. WILSON.

FIDLER, C. E. (1946.) No visible lesions in the bovine, and its relation to avian tuberculosis.—Proc. 50th ann. Meet. U.S. Live Stk sanit. Ass., 1946. pp. 54-59. 840

A survey of poultry was made in an area in which there had been an increase in no-visible-lesion reactors among cattle. In all 10,415 birds on 61 farms were tuberculin tested. Thirty-six of the farms had reactors among the poultry and 17 cattle (47.2%) on the farms reacted to the test. Twenty-five of the farms had no reactors among the poultry, but 14 (or 56%) of the cattle on these farms reacted.

The incidence of "no-visible-lesion" reactors among the cattle on these farms did not appear to be related to the incidence of avian TB. in the poultry flocks.—W. R. KERR.

LIDE, T. N. (1947.) Congenital tularemia.—Arch. Path. **43.** 165-169. [Author's summary copied verbatim.] 841

A case of congenital tularemia, presumably the first, is presented. The disease occurred in the mother during the eighth month of pregnancy

and was followed by infection and death of the fetus. The necrotic granulomas occurring in various organs of the fetus were similar to those which are usually found in adults. Gram-negative coccobacilli consistent morphologically with *P. tularensis* were demonstrated in chorionic villi.

GENEST, P. (1947.) Une septicémie à *Klebsiella friedländeri* chez le vison. [Septicaemia in mink due to *Klebsiella friedländeri*.]—Canad. J. comp. Med. **11.** 265-271. [In French, English summary.] 842

*Bacterium friedländeri* type A infection in a mink, characterized by inflammatory and congestive lesions and enlargement of the spleen, occurred during the summer of 1943, on a ranch near Quebec. It was reproduced experimentally by peritoneal and subcutaneous injections, but not by the ingestion of infected food. Sulphadiazine *per os*, exerted a favourable action on the course of the disease.—P. J. G. PLUMMER.

I. KRISTENSEN, M. (1942.) Recherches sur la fermentation mutative des bactéries. [The mutative fermentation reactions of bacteria. III.]—Acta path. microbiol. scand. **19.** 537-562. [In French. For parts I & II, see *V. B.* 13. 205.] 843

II. KRISTENSEN, M. (1944.) Recherches sur la fermentation mutative des bactéries. [The mutative fermentation reactions of bacteria. IV.]—Ibid. **21.** 214-238. [In French.] 844

III. KRISTENSEN, M. (1944.) Recherches sur la fermentation mutative des bactéries. V. [The mutative fermentation reactions of bacteria V.]—Ibid. **21.** 957-971. [In French.] 845

I. The results of fermentation tests obtained in the course of studying the mutation of a strain of *Salmonella dublin* have been repeated with four other typical strains and partly so with two atypical strains. K. states that the proportion of organisms in which mutation occurs is related to the volume of the culture. This has been shown to be true for the mutative behaviour of *S. dublin* towards arabinose under different cultural conditions. In most cases there is a greater chance of mutation in ordinary cultures than in the partly anaerobic conditions prevailing in capillary tubes. A method is described for studying fermentation in volumes of about 0.1 ml. Primarily *Salmonella typhi* type II has only a feeble capacity to ferment xylose. A general mutation, which occurs quickly results in a tendency to lose this capacity.

II. From one strain of *S. typhi* type II, 24 different variants were produced by inducing the strain to form mutants towards one or more of the carbohydrates dulcitol, *l*-arabinose, xylose and rhamnose. The mutations show no interdepend-

ence. The mutant fermenting xylose is inhibited by dulcitol; this inhibition is easily overcome by a new mutation, but this new mutant has lost its ability to ferment xylose. *S. typhi* type I, i.e., those forms which primarily ferment xylose, are not inhibited by dulcitol. This applies also to some strains of type II, but most strains behaved like the one first studied in being inhibited by dulcitol. In two cases simultaneous fermentation of xylose and dulcitol occurred. The mutation of *S. typhi* towards arabinose was characterized by the frequency of mutation, the fermentative ability of the mutants being greatest in the first two or three days, after which the frequency of mutation and the ability to produce acid are decreased. In some strains of the dysentery group, preliminary treatment by reseeding in different media or by growing them in sugars different from those which they normally ferment, was without any appreciable influence on their fermentative powers.

III. Thirteen strains of Gram negative bacilli which when examined 12 years previously produced gas in mannitol and gave equally slow acid production in lactose and sucrose, were re-examined. One strain did not then ferment lactose and four strains did not ferment sucrose. In the other cases there was either a primary slow fermentation, mutative fermentation or both. The mutative forms developed from either non-fermenting or slow fermenting forms. In some cases there was rapid fermentation on the primary seeding. Experiments in training have generally given negative results. Two forms of *S. paratyphi* B which ferment rhamnose very slowly are classified as R<sub>3</sub> slow primary fermentation and R<sub>4</sub> mutative slow fermentation. It was possible to produce mutants fermenting rhamnose from 35 strains of *S. typhi-murium* which, at a previous examination, did not ferment in one day and in 25 cases not in 14 days. It is suggested that *S. typhi-murium* can be divided into two groups, one in which there is rapid and intense fermentation of rhamnose and one in which the power to ferment rhamnose arises as a result of mutation. The slow fermentation of d-tartrate by some strains of *S. typhi-murium* may or may not be mutative. Delayed fermentation of various sugars in other species of salmonella was examined from the point of view of primary or mutative fermentation.—A. A. WILSON.

LEBEDEV, N. A., & ERASTOV, V. V. (1937.) Patologo-anatomicheskie izmeneniya pri paratife telyat. [Pathology and histopathology of calf paratyphoid (Salmonellosis).]—*Trud. vsegoz. Inst. eksp. Vet.* 14. 124-131. [French summary.]

The authors describe *Salmonella enteritidis*

infection in calves and give details of the examination P.M. of "more than five calves"; they describe acute and chronic types. In the acute form both the respiratory system and alimentary tract are involved; there is diffuse infiltration of the reticulo-endothelial cells of the spleen and of the lymph nodes and periportal tissues of the liver. In the lungs there is fibrinous pneumonia. The visceral lymph nodes are enlarged and haemorrhagic, especially those of the mesentery. The kidneys are slightly enlarged and sometimes there are capsular haemorrhages. The heart muscle is flabby and pale.

In chronic cases apart from retarded growth and poor condition clinical signs may be absent; this type occurs in calves four to seven months old. The most striking lesions are the presence of nodules varying from the size of a pin point to that of a wheat grain, greyish red, with, in the large ones, a yellowish grey centre. The wall of the small intestine may be oedematous and the mucosa may be desquamated. Chronic cases may be carriers.—O. UVAROV.

LOIZELIER, A. B. (1945.) Contribución al estudio de las enfermedades paratípicas de los animales domésticos en España. [Paratyphoid infections of domestic animals in Spain.]—*Trab. Inst. Biol. anim., Madr.* 8. 177-199. 847

L. records an outbreak of *Salmonella typhi-murium* infection in Spain. Infected animals were feavered, and those in the late months of pregnancy tended to abort. Abortion was followed by retention of the placenta, with an inodorous, viscous, discharge for periods up to several months. The use of an autogenous vaccine gave good results.

*S. abortus-ovis* has been isolated from sheep *A. abortus-equi* from a mare and *S. typhi-murium* from the canary and rabbit.—I. W. JENNINGS.

CAMPS, E. E. (1947.) An extensive outbreak of infection due to *Salmonella typhi-murium*.—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* 6. 89-94. 848

An explosive outbreak of food-poisoning due to *S. typhi-murium* is described. 3,000-4,000 persons were affected among a population at risk of about 40,000. The origin of the infection, although not determined with certainty, was probably an infected pig which was slaughtered. As the central area slaughter-house was highly unsatisfactory as to hygienic conditions the contamination of other carcasses from an infected one was inevitable. The carcasses were exposed to flies of which there was an abundance; the carcasses were wiped down with cloths which were dipped in a common bucket of water, which in addition served the slaughter-men to wash their

hands; these cloths were never washed. The walls and the garments of the slaughter-men were heavily soiled with blood and faeces. Although the main vehicle of infection was home-killed raw meat, canned meat was shown to be an important secondary vehicle; it became contaminated in the butcher's shops by the two types of meat being handled together.—A. M.-H.

CRUICKSHANK, J. C. (1947.) **Typhoid fever in Devon: the value of phage-typing in a rural area.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* 6. 88-96. [Author's summary copied verbatim.]

849

A survey of the occurrence of typhoid fever in Devon over a period of three years (1941-1944), aided by typing of the infecting organisms by the Vi-bacteriophage technique, is described.

The value of typing and tracing the sources of infection and in proving the existence of more than eight foci of infection in the County has been demonstrated.

The reservoirs and paths of infection, and the measures of control indicated in such a community are discussed.

WALLACE, W. S., & MACKENZIE, R. D. (1947.) **An outbreak of paratyphoid B fever at Wootton, Isle of Wight.**—*Mon. Bull. Min. Hlth publ. Hlth Lab. Serv.* 6. 32-44.

850

A milk-borne outbreak of *Salmonella paratyphi B* affecting 62 persons is described. As the source of infection two carriers in a distant house were traced. The mud of the field in which the cattle of a dairy farm grazed became infected via a cesspool and stream from which *S. paratyphi B* of the same Vi-phage type as those obtained from patients was isolated.

Only customers supplied with milk drawn at the afternoon milking fell ill. The afternoon milking was done immediately after the cows, splashed with mud, had been driven in from the infected field. This milk, moreover, was stored overnight in conditions favourable for the multiplication of the organisms. The morning milk was drawn when the cows were dry and less likely to contaminate the milk; it was delivered to customers the same morning.—A. MAYR-HARTING.

HERDEGEN, M., HALBERT, S. P., & MUDD, S. (1947.) **Persistence of antigen at the site of inoculation of vaccine emulsified in oil.**—*J. Immunol.* 56. 357-364.

851

A biologically quantitative study was made of the persistence of *Shigella paradysenteriae* antigen at the site of inoculation in mice after subcutaneous injections of the antigen in a mineral oil base. The inoculated material was recovered after various periods of time. The emulsion was broken with ether and the antigen

recovered in a saline medium. The recovered antigen was estimated by observing the antibody response produced after intraperitoneal inoculation into fresh groups of mice. The amount of active antigen in the inoculum was estimated by comparing the various antibody responses with previous calibrations.

Active *Shigella* antigen was recovered from the site of inoculation at periods up to 18 and 24 weeks, depending on the original dose of antigen. The deterioration of antigen at the site of inoculation was paralleled by a fall in agglutinin titres of the mice receiving the oil vaccine.

It was thought that by this method of testing for the persistence of antigen at the site of inoculation all "complete" antigen still biologically active would be detected despite the fact that for certain hypothetical reasons it might not be detected by *in vitro* immunological methods.

—R. R. A. COOMBS.

STEWART, F. H. (1947.) **Mode of origin of sulphonamide-resistant strains in *B. dysenteriae* Flexner.** (*Shigella flexneri*.)—*J. Hyg., Camb.* 45. 28-32. [Author's summary copied verbatim.]

852

The change by which a strain of *B. dysenteriae* Flexner becomes resistant to sulphonamides is similar in character to the change in *B. coli* *mutable* from white (non-lactose-fermenting) to red (lactose-fermenting). The highest proportion of variants are found in papillae, while no variants are found in the growing margin of colonies. Reversion does not take place during growth on sulphonamide-free media. The variation is a direct and heritable response to a chemical stimulus and in adaption to this part of the environment. The variation described by Reiner Müller of *B. typhosus* on rhamnose and of certain coliform bacteria on arabinose may also be of the same nature. Strains of *B. dysenteriae* Flexner resistant to sulphanilamide or sulphaguanidine 1/10,000 are only partially resistant to sulpha-thiazole 1/100,000 and to sodium sulphapyridine 1/10,000.

**Technique.** The size of (uncrowded) colonies on a plate containing 1/10,000 sulphanilamide or sodium sulphacetamide is a useful criterion of resistance or non-resistance, but a resistant strain must be able to grow on 1/5000 Sa and will not grow on 1/5000 Ssac.

The best culture medium for these tests is Lab. Lemco bouillon with agar, but without peptone.

BENDIXEN, H. C., & JØRGENSEN, J. (1940.) **Investigations on the virulence and immunizing power of some *Brucella* strains, with a special view to the selection of strains for vaccination**

of cattle.—*K. VetHøjsk. Aarsskr.* 1940. pp. 80–123. [In English.]

853

The following strains were used:—strain G, continuously used for many years for the vaccination of cattle in Denmark; strain W, a virulent strain; strain 19; and strain 85 (1) received from Dr. Huddleson. The experiments were performed on g. pigs. In each case both agar slopes and broth cultures were used for comparison.

Virulence was estimated from agglutination titres, generalization, and progress of spleen infection. Strain W showed most virulence. Strain 19 was found to possess slight virulence for g. pigs and strain G a little more. G. pigs inoculated with strain 85 (1) showed no signs of infection. This strain produced no immunity but the animals inoculated with the other strains showed a marked increased resistance. Broth cultures appeared to give better results than emulsions made from agar slopes.—S. J. GILBERT.

HARING, C. M., & TRAUM, J. (1944.) Further results from vaccination with strain 19.—*Proc. 48th ann. Meet. U.S. Live Stk sanit. Ass., 1944.* pp. 58–62.

854

Vaccination with strain 19 has been in operation in California for about 12 years and over 50,000 cattle have been vaccinated. Abortions attributable to brucella in animals vaccinated between 4–8 months of age were 0.9% in 1,005 parturitions. Virulent brucella infection has appeared in three herds which had been negative for several years previous to calf vaccination. In one herd delay in removing a reactor was followed by a storm in which abortions occurred in 18.9% of the animals vaccinated as calves, in 16.9% of those vaccinated as adults, and 40.9% of non-vaccinated animals. Most satisfactory results have been obtained in herds in which heavy losses from abortion were occurring at the start of the vaccination programme, and where adult as well as calf vaccination was used in the first year, followed by calf vaccination only in succeeding years.—S. J. GILBERT.

HUTCHINGS, L. M. (1944.) Report of further studies of brucellosis in swine.—*Proc. 48th ann. Meet. U.S. Live Stk sanit. Ass., 1944.* pp. 105–109.

855

Brucellosis in swine does not follow the same course as in cattle. It is more insidious and self limiting, and frequently there is not a high percentage of abortions in infected swine. Young pigs may be actively infected at an early age. Abortions may occur at any time during pregnancy. Breeding difficulties occur and agglutination tests are more useful in herd diagnosis than in detecting infection in individual pigs. Recommendations are made for control of the disease in infected

pure bred herds and commercial herds. In the latter complete disposal seems most economical.

—S. J. GILBERT.

VERWEY, W. F. (1944.) The stability of *brucella abortus* vaccine desiccated by lyophilization.—

*Proc. 48th ann. Meet. U.S. Live Stk sanit. Ass., 1944.* pp. 68–73.

856

Gelatin, bovine serum, and skimmed milk were tested for their stabilizing ability on the viability of desiccated *Br. abortus* strain 19 vaccines. Bovine serum and skimmed milk aided in maintaining viability and lyophilized vaccines were much more stable than liquid preparations. Skimmed milk proved the best agent because it gave the greatest stability at temperatures up to 98°F.—S. J. GILBERT.

STUBBS, E. L. (1944.) Studies on the allergic activity of *brucella abortus*.—*Proc. 48th ann. Meet. U.S. Live Stk sanit. Ass., 1944.* pp. 63–67.

857

Suspensions of killed brucella organisms, filtrates of broth cultures and extracts have been used in skin tests with varying results. Preliminary studies in rabbits and g. pigs are described, in which bacteria killed by sonic vibration have been used for the preparation of an antigen. In a herd of 117 cows, infected for several years, five blood and five skin tests were performed within one year. Of 63 old reactors there was complete agglutination in 41 at 1 : 100 or higher. Of these 33 yielded good skin reactions while 8 were doubtful or negative. Seventeen old reactors classed as suspicious to the blood test reacted to the skin test. Three negative to the blood test were positive to the skin reaction. One cow with a suspicious blood titre was negative to the skin test, and one was negative to both tests. The use of sonic filtrate is limited by the fact that it produces positive but transient reactors, and there are other difficulties to be overcome.—S. J. GILBERT.

QUARMBY, W. B. (1946.) An investigation into entero-toxaemia in goats.—*Vet. Rec.* 58. 581–582.

858

An account is given of a chronic and sometimes fatal wasting illness in a herd of goats. The first animal to die had a heavy worm infestation, but the disease continued in the herd the next year despite apparently effective anthelmintic treatment. The affected animals showed anaemia, loss of milk yield, intermittent diarrhoea, progressive emaciation and ascending paralysis. One characteristic autopsy finding was a penetrating odour from the carcass. In the intestine of one goat, the presence of *Clostridium welchii* type D was demonstrated; the administration of type D antiserum resulted in rapid recovery in the case of a billy goat that was just becoming anaemic,

but females treated recovered only slowly. It is proposed to inoculate kids with serum within a few days of birth and again a month later.

—E. COTCHIN.

RICHOU, R. (1944.) L'anatoxine tétanique la vaccination antitetanique du cheval la sero-anatoxitherapie spécifique du téton. [Antitetanic serum and anatoxin in treatment and prevention of tetanus in the horse.]—*Encyclopéd. vét. périod.* 1. 31-34. 859

Ramon showed [see *V.B.* 8. 348] that tetanus toxin obtained from broth culture could easily be changed by the combined actions of formalin and controlled heat into an anatoxin which while quite avirulent was capable of giving good protection to both laboratory and field infection with tetanus. In addition to its use in prophylaxis the product in conjunction with antitetanic serum has given good results in the treatment.

Vaccination is the rational method of control and should be practised on all young horses from the age of six months. When anatoxin is used on pregnant females the foal may receive protection *via* the foetal membranes. The injection is given subcutaneously in the neck region in two doses of 10 ml. at an interval of a month. The two doses can be followed by a third after six months or a year if the immunity requires to be enhanced for any reason, and a solid protection lasting for from 2-10 years can then be expected.

Ramon later developed the practice of combining antitetanic serum and anatoxin therapy, using a subcutaneous injection of anatoxin, followed a quarter of an hour later, and in another part of the body by a single massive injection of about 200,000 units of serum with two injections of anatoxin in a dose of 10-20 ml. at intervals of five days.—S. BRIAN KENDALL.

WILLEMS, R. (1941.) Le botulisme du cheval en Belgique. [Botulism in the horse in Belgium.]—*Acta biol. belg.* 1. 353-356. 860

Botulism had been observed in about 30 draught horses on ten different farms. Polluted water supplies, mouldy hay, or oats contaminated with rat excreta, were suspected as an infection source. In three cases, mummified bodies of cats were found in the hay. *Clostridium botulinum* had not been recovered from suspected material, but in the case of two horses out of seven which died on one farm, *Cl. botulinum* toxin was found in the liver and intestine, and from the liver of one of these, an organism, provisionally identified as *Cl. botulinum* type D, was recovered, and used in reproducing the disease experimentally in animals, including a horse.—E. COTCHIN.

PLUMMER, P. J. G. (1946.) *Actinomycosis. Histological differentiation of actinomycosis and actinobacillosis.*—*Canad. J. comp. Med.* 10. 331-337. [French summary.] 861

A note emphasizing the importance of differentiating between *Actinomyces bovis* and *Actinobacillus ligniersi* infection.—R. GWATKIN.

BURROUGHS, A. L. (1947.) *Fowl spirochetosis transmitted by Argas persicus (Oken), 1818 from Texas.*—*Science.* 105. 577. 862

Attention is drawn to recent reports of a mild form of spirochaetosis of turkeys in California, in which no vectors could be found.

Large numbers of *Argas persicus* from Texas placed on a fowl in Minnesota caused disease, but no spirochaetes were detected in this bird. The progeny of these ticks placed on another fowl caused jaundice, anorexia and diarrhoea. Spirochaetes appeared in the blood on the seventh day, but had disappeared by the ninth day. Both birds recovered.

It is believed that this is the first finding of tick-borne avian spirochaetosis in the U.S.A.

—U. F. RICHARDSON.

VISWANATHAN, G. R., PILLAY, M. R., & AYYAR, S. V. (1947.) *Contagious caprine pleuro-pneumonia—some field observations in Madras Presidency.*—*Indian vet. J.* 23. 435-446. 863

This is held to be the same disease which was studied by Longley [see *V.B.* 12. 43] in Madras. It is confined to goats and is distinguished from other pneumonias due to helminths, pasteurella and goat-pox virus. The mortality may be 70-80% and the disease is easily spread by unrestricted movement of goats. Cases are usually relatively acute, the course being 3-8 days, and recovered goats are immune. There is no definite seasonal or regional incidence, though it is perhaps more common in the cooler season. Outbreaks last from 15 days to three months, depending on the number of goats at risk. Lesions are confined to the lungs, commonly unilateral, and pleura, and are of fibrinous character, the exudate rapidly clotting on exposure. A prophylactic vaccine consisting of formalized lung tissue suspension was useful for controlling outbreaks. This statement is based on over 7,000 vaccinations in the face of outbreaks, with 3.0% resulting mortality. Trials with cultures of the "virus", weakened by repeated culture, have to be repeated. Treatment of early cases with intravenous injection of neosalvarsan (0.2-0.375 g.) or novarsenobillon (0.1-0.15 g.) gave about 75% recovery.—F. C. M.

KWONG, F. J. (1947.) *Infectious pleuropneumonia of goats in North-western China.*—*Chin. J. anim. Husb.* 6. Nos. 5, 6 & 7. 12-17. 864

In 1933, an outbreak of infectious pleuropneumonia of goats occurred with a mortality of 90% in a mountainous district in the vicinity of Lauchow, covering an area of about 30-40 square miles. Four natural and 23 experimental cases were studied. The causal agent was a pleuropneumonia-like organism. The mode of infection, incubation period, syndrome and pathology were studied.—S. J. CHU.

DAS GUPTA, B. M., & SEN, R. L. (1945.) **Canine leptospirosis in Calcutta.**—*Indian J. vet. Sci.* 15. 52-54.

865

The two types of canine leptospirosis, caused by *L. icterohaemorrhagiae* and *L. canicola* respectively, are briefly described and reference is made to an outbreak of leptospiral jaundice in Madras hounds by Ayyar [see *V. B.* 3. 480]. A case of jaundice in a dachshund pup, five and a half months old, was diagnosed clinically as leptospirosis. The pup was destroyed when moribund. The organisms were not seen in liver sections or by dark-ground illumination in liver and kidney. Four young g. pigs and three adult dogs were inoculated intraperitoneally with liver or kidney tissue suspensions. The three dogs remained well, but two of the g. pigs developed signs of infection, one dying on the 17th day and the other being killed when moribund on the 18th day. Liver tissue from those two animals was heavily infected with leptospires. Heart blood was also positive and was cultured in different media; a good growth was obtained after repeated subculture in Fletcher's medium.

Agglutination tests of the organism thus cultured were carried out with *L. canicola* sera prepared from strains from a dog, a rat, and three human strains. The reaction was strongly positive with sera prepared from one human and one rat strain (both of *L. icterohaemorrhagiae*). Negative results were obtained with serum prepared from the strain of *L. canicola* from the dog.

The difficulty that may arise in demonstrating leptospires in affected dogs is emphasized.

—M. K. SREENIVASAN.

VAN RIEL, J. (1946.) Le foyer centro-africain de leptospirose. (Contribution au problème de l'unité ou de la pluralité des leptospires du type *L. icterohaemorrhagiae*). [Leptospiral infections in Central Africa.]—*Ann. Soc. belge Méd. trop.* 26. 197-314.

866

Attention is drawn to the paucity of information as to the forms of leptospirosis in regions of Africa north of the equator, where previous to 1938 leptospires had not been isolated in culture, although suspected human infection had been encountered, and positive agglutination tests were on record. In one case, however, a

g. pig had been successfully infected by subinoculation. Working in the Kivu area of the Belgian Congo between 1936-1945 Van R. encountered 364 human cases, the majority in miners from two groups of mines, and in 18 cases he isolated the organism concerned in culture. In addition to the organisms isolated from man, leptospires were also isolated from a local rodent, *Arvicantis abyssinicus*, and from water from one group of mines, in which the water was alkaline (pH 7.6). The importance of the reaction of the water on the survival of pathogenic leptospires is discussed at length. Though no organisms were isolated from local dogs, animals giving positive agglutination reactions were encountered.

The 21 strains of organisms isolated in Kivu were tested against named strains from European laboratories by the method of the absorption of agglutinins. Strains were present which were apparently serologically identical with *L. grippotyphosa* and *L. bataviae*, and other strains appeared to be closely related to *L. icterohaemorrhagiae* and *L. canicola*, but two strains were present, which if judged on serological reactions would have to be considered as new species.

The question of the plurality of leptospiral species is discussed at length. It is pointed out that the classification of species rests on what are claimed to be fixed differential characters in clinical signs, geographical distribution, reservoir hosts, epidemiology and pathogenicity to g. pigs, but that working on these criteria new species are being continually added to the list. The Kivu investigations do much to invalidate these claims in respect of the association of serological types with clinical signs, geographical distribution, epidemiology and reservoir hosts. It is suggested that too much stress has been laid on the influence of reservoir hosts and too little on the survival of the organisms in water.

—U. F. RICHARDSON.

SCHMID, G., & GIOVANELLA, R. (1947.) Über die Schweinehüter-Krankheit. [Swineherds' disease.]—*Schweiz. Arch. Tierheilk.* 89. 1-13.

867

An account is given of the history of swineherd's disease and the isolation of *Leptospira pomona*. The claim that this organism causes disease in swine is discussed.

In attempts to ascertain the incidence of swine infection in the neighbourhood of Berne, agglutination tests were made on blood samples of pigs, specimens of pigs' organs from the slaughter-houses were examined, and five piggeries, in connexion with which human cases of disease had been recorded, were inspected. Only saprophytic spirochaetes were detected in the organs examined, and although leptospires were

found in individual animals in the suspected piggeries, the health of the animals was good.

Experimentally a pig was infected with a strain of *L. pomona* from a human patient. It developed fever, and mild conjunctivitis, with some loss of appetite and frequent micturition. These clinical symptoms subsided in about a week. A positive agglutination test was given a week after infection, and leptospira appeared in the urine in a fortnight and persisted for over a year. Five other animals were infected from the first either by contact, or by smearing the snout and nasal mucous membrane with urine. Three animals developed fever and loss of appetite, and one showed weakness in the hind limbs. All recovered except one which died from erysipelas. The leptospira were numerous in the urine for about six months, and after a year were either absent or rare.

The impression given was that the organism did not cause any serious disease in pigs, but was easily transmitted by contact, and might persist in piggeries with consequent danger to attendants.

—U. F. RICHARDSON.

DUBOS, R. J. (1947.) The effects of lipids and serum albumin on bacterial growth.—*J. exp. Med.* 85. 9-22. [Author's summary copied verbatim.] **868**

Long chain fatty acids have been found to exhibit both inhibitory and stimulatory effects on the growth of tubercle bacilli and of a certain unidentified micrococcus culture.

The toxicity of the fatty acids was much reduced or abolished by (a) esterification, even when the resulting product was a water-soluble ester, and (b) addition of crystalline serum albumin to the culture medium; other proteins tested were inactive in this respect.

Marked growth stimulation of the micro-organisms studied was obtained when certain long chain fatty acids were added to the culture medium in the form of their water-soluble esters, or in admixture with adequate amounts of serum albumin.

Abundant growth of the micrococcus resulted

See also absts. 946 (staphylococcal mastitis); 980 (coliform bacteria); 982 (tuberculosis); 1003 (pleuro-pneumonia group); 1004 (acid-fast bacteria); 1005 (anthrax); 1012-1024 (annual reports).

#### DISEASES CAUSED BY PROTOZOAN PARASITES

VAN DEN BRANDEN, J. F. (1942.) Réaction de fixation du complément chez des lapins normaux avec l'antigène a *Trypanosoma equiperdum* et avec l'antigène a *Trypanosoma evansi*. [Complement fixation reaction in normal rabbits with antigen for *Trypanosoma equiperdum* and antigen for *Trypanosoma evansi*.]—*Acta biol. belg.* 2. 26-29. **870**

from the addition of oleic, linoleic, linolenic, or arachidonic acid (0.0001 to 0.001 per cent) to a mineral medium containing glucose as sole source of carbon; in the case of this microbial species, none of the other substances tested could substitute for these unsaturated fatty acids.

Enhancement of growth of tubercle bacilli was obtained by adding to the medium 0.001 to 0.01 per cent of a variety of fatty acids (saturated or unsaturated) even in the absence of glucose or of any other readily available carbon compound.

These results suggest that long chain fatty acids can affect the growth of different microbial species through different metabolic channels and that, in order to study the mechanism of these metabolic and growth reactions, it is essential to use the fatty acids under conditions where they cannot manifest their toxic properties.

PALMEIRO, J. M. (1946.) Noticia do resultado do emprego de um tipo de vacina contra a linfangite epizoótica. [A note on a vaccine for prevention of epizootic lymphangitis.]—*Rev. Med. vet., Lisboa.* 41. 436-438. [French summary.] **869**

After 45 days' cultivation in chicken broth, the organisms are centrifuged washed, dried and triturated; 5 mg. are suspended in 5 ml. of distilled water and 0.5% phenol, placed in ampoules and incubated twice for one hour at 62-64°C. The vaccine will remain active for many months if left cool and away from light. The author states that 1,800 animals have been given preventive treatment and 2,000 curative treatment, of which 40 relapsed. As a preventative the vaccine was administered subcutaneously under the skin of the neck, in increasing doses of 1, 2, 3, 4 and 5 ml. at 15-day intervals as a curative, the last dose of 5 ml. was continued but not exceeded until cure was complete. It is stated that there was generally an improvement at 4-5 weeks but that 10-12 injections were necessary. If a local reaction occurred the dose was reduced to 1 ml. and then gradually increased when the reaction ceased.

—R. MACGREGOR.

The sera of rabbits infected with *T. brucei* and those of normal rabbits were tested for complement fixation with antigens prepared from extracts of *T. brucei*, *T. evansi* and *T. equiperdum* separated from infected blood by fractional centrifugation. Whilst normal rabbit sera did not give complement fixation with these antigens, the sera of rabbits infected with *T. brucei* was positive

to *T. brucei* or *T. evansi* antigen in 91% of cases, and to *T. equiperdum* antigen in 75% of cases.

—U. F. RICHARDSON.

VAN DEN BERGHE, L. (1941.) Trypanosomose d'un poussin éclos après inoculation chorio-allantoidienne de *Trypanosoma evansi*. [Trypanosomiasis in a hatched chick after inoculation of *Trypanosoma evansi* into the chorio-allantion membrane.]—*Acta biol. belg.* 1. 146-151. 871

The records of the infection of embryo chicks with protozoan parasites are discussed, the author recording positive results with *Leishmania infantum*, *Trypanosoma cruzi*, *Tryp. brucei*, *Tryp. evansi*, *Borrelia duttoni*, *Spirochaeta morsus muris* and *Trichomonas foetus*, and negative results with *Plasmodium gallinaceum*, *Tryp. vespertilionis*, *Tryp. minasense* and *Tryp. fringillae*.

Infection with *Tryp. evansi* occurred in embryos inoculated between the 8th and 14th days of incubation, but not between the 15th and 17th days. Four chickens which hatched after inoculation of the embryo on the 10th day of incubation were negative for trypanosomes, but one showed a heavy blood infection which persisted for four days, and then declined, disappearing on the 9th day, when the blood was no longer infective to mice. Attempts to transmit this infection to other chickens, and fowls, were unsuccessful.—U. F. RICHARDSON.

DUBOIS, A. (1942.) Action du trichlorure d'arsenic sur l'infection expérimentale par *Trypanosoma congolense*. [Action of trichloride of arsenic on experimental infection with *Trypanosoma congolense*.]—*Acta biol. belg.* 2. 5-10. 872

The curative action of arsenic trichloride by inhalation on mice infected with *T. congolense* was demonstrated, but it is pointed out that the therapeutic index is too low to permit the use of the drug in practice, that *T. congolense* is usually considered resistant to arsenicals, and the strain under experiment was shown to be resistant to a large number of arsenical compounds. Arsenic trichloride was also found to be trypanocidal to *T. congolense* by subcutaneous and intraperitoneal injection, but again was toxic to the mice. The mechanism involved in its trypanocidal activity is discussed.

—U. F. RICHARDSON.

RODHAIN, J. (1942.) Au sujet du développement intracellulaire de *Trypanosoma lewisi* chez *Ornithodoros moubata*. [The intracellular development of *Trypanosoma lewisi* in *Ornithodoros moubata*.]—*Acta biol. belg.* 2. 413-415. 873

RODHAIN, J. (1942.) Au sujet de développement intracellulaire de *Trypanosoma pipistrelli* (Chat-

ton et Courrier) chez *Ornithodoros moubata*. [The intracellular development of *Trypanosoma pipistrelli* (Chatton and Courrier) in *Ornithodoros moubata*.]—*Ibid.* 2. 416-420. 874

An invasion of the intestinal cells of *O. moubata* by *T. lewisi* and *T. pipistrelli* occurred when the ticks fed on infected animals. The exact morphology of the intracellular trypanosomes is obscured by erythrocytic melanin. The survival period of *T. lewisi* was ten days. It was thought that the cell invasion represented attempted intracellular multiplication, and was not a simple phagocytosis, but it was only short-lived, and did not lead to a persistence of infection.

Intracellular forms of *T. pipistrelli* persisted for at least 60 days, and probably represented multiplicative process, the detail of intermediate stages were not observed clearly but resulted finally in the formation of eight trypanosomes. Intracellular spherical forms are described in which the periplast showed undulations resembling small pseudopodia, and in which no flagellum could be detected. These forms might represent a stage of involution, but it appeared that they lengthened, a flagellum reappeared, and after rupture of the cell, they appeared free in the intestines as actively motile curved forms which eventually straightened.—U. F. RICHARDSON.

VAISMAN, A. (1947.) L'atténuation de l'infection trypanosomique expérimentale chez la souris, par le *Spirochaeta duttoni*. [Attenuation of experimental trypanosome infection in mice by *Spirochaeta duttoni*.]—*Bull. Soc. Path. exot.* 40. 74-76. 875

On the inoculation of *Sp. duttoni* into mice at the same time as a dose of *T. equiperdum* which was expected to produce death in 4-5 days, it was found that instead of producing death, the trypanosomes disappeared from the circulation on the 4th or 5th day, and though relapse and death might occur later, in two mice recovery occurred.

If the trypanosomes were injected a few days after the spirochaetes, the incubation period was prolonged, after which infection followed the same course as in simultaneous inoculation. If the spirochaetes were inoculated 48 hours after the trypanosomes death appeared to be hastened. *Sp. duttoni* appeared to have no direct action on trypanosomes, nor could any anti-trypanosome property be detected in sera from mice which had survived the trypanosome-spirochaete crisis.

—U. F. RICHARDSON.

HO, E. A., CHU, H. J., & YUAN, I. C. (1941.) A report of two cases of canine leishmaniasis with reference to the development of skin lesions. —*Chin. med. J.* 60. 84-86. 876

The view held by FALCHETTI (1932) was not

verified by the authors; that the skin was the primary site of multiplication before the secondary invasion of the internal organs.

Two naturally infected dogs were used. The first case, four years old, appeared in good health, the skin was normal; although skin scrapings from the ears were negative for L.D. bodies, bone marrow biopsy specimens however revealed the parasite. Three months later leishmaniasis was confirmed clinically and P.M. The symptoms were inappetence, accompanied by cutaneous lesions on the ears, face and hind legs.

The second case, a five-year-old dog, found by marrow biopsy puncture to have visceral leishmaniasis. The skin, however, remained normal: only after two months did the hair begin to drop off, leaving affected parts scaly and bleeding. Scrapings revealed L.D. bodies and P.M. they were also found internally.

The authors therefore concluded that the parasite probably multiplies first in the internal organs and later in the skin and that the cutaneous lesions, characterized by depilation and seborrhoea, are late manifestations of the disease.—S. M. G.

KERR, W. R., & ROBERTSON, M. (1948.) **A study of the antibody response of cattle to *Trichomonas foetus*.** —*J. comp. Path.* 53. 280-297. 877

The authors make further observations on the development of specific serum agglutinins in response to *Trichomonas foetus* antigen, [see *V. B.* 12. 408.] in the form of live organisms, in artificial infection experiments, and after saline extracts instilled into the uterus. Infection was established in five out of seven virgin heifers by the introduction of washed cultures of living *T. foetus* into the vagina after service. These infections failed to interfere with pregnancy in four out of five animals. This low type of infection produced no change in the agglutination titre of the sera of these animals.

The introduction of living *T. foetus* into the uterus after service produced infection in one virgin heifer and one healthy cow; the latter developed a positive blood titre.

Natural service by an infected bull produced infection in one of two virgin heifers; neither developed specific serum agglutinins. The successful reinfection after treatment of a young cow resulted in the development of a low positive blood titre.

The introduction of a saline extract of *T. foetus* into the *uteri* of non-gravid cows resulted in most cases in the absorption of the antigen and the stimulation of specific serum antibodies; the variable antibody response was considered to be due either to non-absorption of antigen, or failure to respond to antigen stimulation.

Usually after the third instillation of the ex-

tract into the uterus, or—in two animals which had previously been naturally infected—after the first instillation of antigen, there was a systemic reaction due to the sensitization of the animal to the extract. This sensitization did not appear to depend upon the necessary demonstration of circulating antibody. The calf from a cow with a positive blood titre was found to acquire agglutinins to *T. foetus* 16 hours after being fed with maternal colostrum. The titres of the colostrum and the calf serum were above the titre of the maternal serum.—A. E. PIERCE.

KERR, W. R., & ROBERTSON, M. (1946.) **A study of the passively acquired antibody to *Tr. foetus* in the blood of young calves and its behaviour in agglutination tests and intradermal reactions.** —*J. comp. Path.* 56. 38-48. 878

Cows with a high specific titre to *Trichomonas foetus* and stimulated before, or during gestation gave birth to calves with no agglutinins in their serum. The normal non-specific agglutinins which have been detected in the serum of all normal adult bovines appeared to be excluded, these normal serum globulins and antibodies according to Pedersen (1945) are replaced in the new-born calf by a low molecular globulin called "fetuin". The colostrum from cows with specific blood agglutinins to *T. foetus* was found to contain specific agglutinins and when fed to calves during their first few hours of life produced the rapid development of agglutinins in the calves' blood and a positive blood agglutination test [see *V. B.* 12. 408]. This passive development of blood agglutinins to *T. foetus* could be induced in calves born from normal cows or from cows with a high blood titre. The passively acquired antibody was also found to become fixed in the skin of the calf where it could be detected by an intradermal test [see Kerr. *V. B.* 15. 820].

If milk was boiled to destroy any antibody content and fed to a calf during the first 24 hours of life, the authors found that the subsequent substitution of high titre colostrum was not followed by the appearance of any specific blood agglutinins in the calf.

If the calf was fed on colostrum from a normal mother a variable blood agglutinin of a non-specific nature was detected in the serum of the calf, the titre was, however, nearly always below the normal non-specific titre of the adult bovine, and was found to drop still further until by the third to the fourth week of life it was almost zero. From the fourth to the eighth month of life the calf was found to develop a non-specific blood titre of its own, which in the authors' experience was not accompanied by any sensitization of the skin to the intradermal test.

One hour after birth a calf was fed 20 fluid

ozs. of serum with a high specific titre to *T. foetus*, as its first meal, a high blood titre was detected three days later, and the animal became skin sensitive to the intradermal test five to eight months later. A second calf given normal serum developed a very slight blood agglutinin [no intradermal test results are recorded on this animal].

Serum with a high specific titre to *T. foetus* injected subcutaneously into a normal ten-day-old calf resulted in a high agglutinin titre in the blood of the calf within 24 hours, and 11 days after the injection the skin was sensitive to the intradermal test.

The subcutaneous injection of normal adult bovine serum gave a slight titre in the blood of the calf 48 hours later, while the skin remained negative when tested intradermally eight weeks after the injection.

The authors conclude that specific antibody passively acquired by calves reacts in agglutination tests with *T. foetus* and produces a skin sensitivity to the intradermal test. That the agglutinin present in all normal adult bovine serum is not present in the blood of the new-born calf, and that when it eventually develops it is not stimulated by trichomonas antigen. It does not become fixed in the skin and gives rise to no skin sensitivity detectable by the intradermal test.—A. E. P.

KERR, W. R., & ROBERTSON, M. (1946.) Experimental infections in virgin heifers with *Trichomonas foetus* in vaccinated and unvaccinated animals.—*J. comp. Path.* 56. 101-113. 879

The authors record in detail the results of infection experiments on three groups of virgin heifers. Group I comprised two virgin heifers neither of which had received any treatment prior to infection. Group II. Four heifers vaccinated three times by the intramuscular injection of living trichomonads. Group III. Five heifers which as new-born calves had received colostrum from mothers with a high specific blood titre to *T. foetus*. Each calf had therefore developed a passive blood titre to the blood agglutination test [see *V. B.* 12. 408], and had reacted to the intradermal test [see Kerr, *V. B.* 15. 820]. Both these reactions had disappeared in these calves for at least six months before exposure to infection. Nine animals were infected and inseminated simultaneously by the injection into the cervical canal of 2 ml. of semen to which a washed suspension of five to ten million motile trichomonads had been added. The remaining two animals D2 in Group I, and D4 in Group II, were infected four hours after insemination by the introduction unto the cervix of 100 million trichomonads in 5 ml. of saline solution. One animal in Group I became infected and returned to oestrus, the other, D2, became pregnant and resisted infection.

D4 in Group II appeared to resist infection but failed to conceive and when reinseminated three weeks later, without a further attempt to infect, conceived and had a normal pregnancy. The remaining three heifers became infected and subsequently aborted.

In Group III two heifers aborted, two became infected but calved at full term, one resisted infection and also calved normally. The blood agglutination test showed that the intramuscular injection of live *T. foetus* as an antigen produced in each heifer high blood titres, and a positive intradermal reaction, but it is concluded that this method of vaccination did not appear to protect the heifers from infection. Periodic blood agglutination, and skin intradermal test results are recorded during the course of the infection in the heifers.—A. E. PIERCE.

FLORENT, A. (1941.) La trichomoniasis du bétail. [Bovine trichomoniasis in Belgium.] —*Ann. Méd. vét.* 85. 129-142 & 165-191. 880

The article comprises a limited review of the literature, together with some of F.'s experimental observations.

In *in vitro* chemical tests carried out on cultured trichomonads using rivanol, chinosol, Lugol's iodine and chloramine, the latter was the most efficient, immobilizing the trichomonads immediately in a 0.02% concentration. F. records his modification of Cailleau's medium (1937). He was unable to maintain contaminated cultures, but considered that certain bacteria appeared to favour prolonged survival of the organism in culture medium.

The trichomonad is considered capable of lysing the foetal placenta, this together with the loose attachment of the placenta in early pregnancy accounts for the infrequent retention of the placenta at abortion. All pyometras are considered to have been preceded by a period of gestation.

Sixty out of 100 bulls examined showed lesions associated with the genitalia: *T. foetus* was demonstrated in eight bulls, five of these had clean mucosae, while three showed a very slight balanitis and acrobystitis.

G. pigs experimentally infected by intrauterine inoculation aborted and organisms were recovered up to 5-6 days after the abortion. Intracardiac and intraperitoneal inoculations did not produce abortion, two out of 15 g. pigs inoculated *via* the latter route died on the 15th and 25th respectively and trichomonads were recovered.

Three out of six mice inoculated intracranially died eight days later and trichomonads were recovered. In a bovine experimentally infected with 50 ml. of pyometra fluid bacterio-

logically sterile, but containing active *T. foetus*, the oestral cycle persisted and trichomonads were recovered up to the fifth oestral period; the most suitable time to collect samples for the demonstration of *T. foetus* was found to be two days before oestrus.

See also absts. 903 (trypanosomiasis); 948 (coccidiosis); 949 (avian malaria); 1012-1024 (annual reports).

### DISEASES CAUSED BY VIRUSES AND RICKETTSIA

—. (1943.) Feststellung des Typs der Maul- und Klauenseuche bei Neuausbrüchen. Runderlass des Reichsministers des Innern. [Germany: Circular on typing of foot and mouth disease outbreaks.]—*Dtsch. Tierärztebl.* Dec. 9th. Abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* February 4th. 51. (1944.) 881

When cases appeared in a district which had been free for at least a month, material, consisting of the raised epithelium of fresh unopened vesicles, preferably from the tongue, was to be sent to the Island of Reims institute for typing of the virus by the complement-fixation test as carried out by Traub; a bivalent vaccine would be used until the type-specific vaccine was ready. Similar material was to be sent if, during an outbreak, the character of the disease was observed to change.—E. COTCHIN.

KOFOED, H. (1942.) Om Dyrkning af Mund- og Kolvesygevirus paa Lungevaev fra Kalveostre. [Culture of foot and mouth disease virus on lung tissue from bovine foetuses.]—*Maanedsskr. Dyrlaeger.* 54. 45-51. 882

Whether lung tissue is better than embryonic skin as a culture tissue for the purpose of preparing culture virus in the greatest possible quantity was investigated.

Skin or lung removed aseptically from 30 cm. long calf foetuses, virus suspension and Tyrode's fluid, were used for culture. The lung tissue was cut to particles of 2 mm. diameter before addition to the other ingredients in Petri dishes of 13.5 cm. diameter. The seeded cultures were incubated at 37°C. for 36-40 hours and the virus removed by repeated centrifugation.

Skin and lung tissue gave similar results, without regular advantage of one over the other, and in the conditions of the experiment 30 fold multiplication of virus was usually obtained.

Further experiments showed that there is no advantage in adding plasma or serum to the three ingredients referred to above: Tyrode's fluid suffices.

The influence of the time period elapsing between the removal of the foetus from the cow and the setting up of the embryonic tissue culture was studied. Better virus multiplication was obtained in the most fresh tissue cultures. Cold

F. considers that some resistance to reinfection exists; he was unable to reinfect an animal with pure cultures of *T. foetus*, and found a mucus sample from an infected animal capable of immobilizing and agglutinating the trichomonad.

—A. E. PIERCE.

storage for 18 hours had a deleterious effect on the tissue.

For lung tissue cultures the lungs from foetuses older than 40 days were most advantageous. Such have a haired skin which is unsuitable for skin tissue culture. Even lung tissue from sucking calves furnished a good tissue culture. To find out whether the lungs in living adult cattle provide a culture tissue in which the virus can live or increase, two cows were injected intravenously with virus, but no virus could be recovered from the lungs two days later.—J. E.

LIN, Y. C. (1947.) [Aujeszky's disease, the first case reported in China.]—*Chin. J. anim. Husb.* 6. 6-7. 883

A cat with an affection resembling rabies was examined. The symptoms were diarrhoea, restlessness and posterior paralysis, with no indication of pruritus. Rabbit inoculation in series and microscopic examination of brain material were sufficient evidence to diagnose Aujeszky's disease, which L. claims to be the first occurrence in China.—S. J. CHU.

BASSET, J. (1941.) La fièvre typhoïde du cheval (Pferdestaube, pink eye) avec diverses considérations sur les suivantes maladies infectieuses du cheval: pneumonie, bronchite, anémie. [Equine influenza (pink eye), with notes on pneumonia, bronchitis and infectious anaemia of horses.]—*Rev. Méd. vét., Lyon et Toulouse.* 92. 5-31 & 49-77. 884

At the present time, in view of the existence of articles appearing later than Basset's and in view particularly of the lack of protocols in his paper, this work is now hardly significant and does not contribute any further clarification. B.'s main argument is to the effect that there is a distinct disease of horses caused by a filtrable virus; that it is transmissible by whole or fractionated blood or by coitus and that it gives rise to a durable immunity. This is "Fièvre typhoïde" or pink eye. The symptomatology and pathology are described in detail, also the diagnosis. The absence of cough differentiates it from the respiratory-localized group of diseases (infectious bronchitis and contagious pneumonia) and the nature of the illness (acute fever) from

infectious anaemia. [Certain statements about the behaviour of fièvre typhoïde under experimental conditions are difficult to follow in absence of experimental particulars.]

The second part of the article is about infectious bronchitis and infectious anaemia, consisting of annotatory remarks.

B. believes that horses recovered from fièvre typhoïde are carriers of the virus for about five months, but that stallions can carry and transmit it for some years. [Readers are referred to a review of the equine respiratory diseases by Francis (see *V. B.* 14, 165).]—J. E.

JURADO, F. R. (1947.) El virus paloma y el virus gallina en la inmunización contra la difteroviruela de las aves. [Fowl pox vaccination.]—

*Rev. Med. vet., B. Aires.* 29. 717-743. 885

Fowl pox virus of fowl origin, carefully applied by a skin puncture technique, gives a solid immunity to homologous virus, from 16 days after vaccination. Virus from pigeons confers a good immunity to natural infection with fowl virus, but will not protect against artificial infection. J. recommends that vaccine of fowl origin should be used in young birds of 6-12 weeks, but that pigeon pox vaccine should be used in the older birds, since it does not affect laying ability. [The safety of vaccine of fowl origin would depend upon the virulence of the strain used.]—I. W. JENNINGS.

KNIGHT, C. A. (1947.) The nucleic acid and carbohydrate of influenza virus.—*J. exp. Med.* 85. 99-116. [Author's summary copied verbatim.] 886

Both ribonucleic and deoxyribonucleic acids have been obtained from purified particles of PR8 influenza virus. These particles were also found by extraction with formamide to contain carbohydrate in addition to that of the nucleic acids. Carbohydrate-rich fractions, essentially devoid of nucleic acid, were obtained not only from the particles representing PR8 virus but from those of Lee influenza virus as well. The carbohydrate in each case appeared to be a polysaccharide composed of mannose, galactose, and glucosamine units.

CARNEIRO, V. (1946.) Encefalomielites infecciosa das equídeos. [Equine infectious encephalomyelitis.]—*Arg. Inst. biol., S. Paulo.* 17. 269-330. [English summary.] 887

A general article containing no new knowledge on the subject of the equine encephalomyelitis, with particular reference to the epizootiology in the U.S.A. and in Brazil.—I. W. JENNINGS.

BRION, A. (1944.) Anémie infectieuse du cheval. Diagnostic. [The diagnosis of equine infectious anaemia.]—*Encyclopéd. vét. périod.* 1. 39-41. 888

Practitioners are inclined to ascribe any ill-defined cases of disease to equine infectious anaemia in areas where this disease is prevalent, whilst in areas where it is rare it is not recognized. Clinically it is characterized by intermittent attacks of fever, during which there is a disinclination to move, oedema of dependent parts, emaciation, and a loosening of the hairs. In acute cases the animal may die during the first attack. During the remissions animals remain anaemic and weak, and the condition may be ascribed to worms, for which reason it is recommended to attempt to provoke an attack by bleeding; the injection of serum or physiological saline, or "aleurone" (1-5 g.), peptone (20-30 g.), mallein or tuberculin, but the results are irregular.

It can be distinguished from equine pleuropneumonia and contagious pneumonia in that these conditions spread rapidly whilst infectious anaemia is slow spreading. Tuberculosis and glanders can be eliminated by allergic reactions. It can be mistaken for piroplasmosis, but this condition responds to treatment with acriflavine or acaprin, and the urine contains bilirubin, and sometimes haemoglobin.

Practitioners can examine the blood for anaemia by the sedimentation tests. 1 ml. of a 3% solution of sodium fluoride is drawn into a 10 ml. syringe, and then 9 ml. of blood is also drawn in and the fluids mixed. This mixture is then evacuated into a tube, and the rapidity of sedimentation determined by reading the height of the supernatant plasma after half an hour, and again after 24 hours.

The ratio  $\frac{\text{fall of red cells in 24 hours}}{\text{fall of red cells in } \frac{1}{2} \text{ hour}}$  indicates

the rapidity of sedimentation and is normally 0.5, but in anaemic conditions, particularly infectious anaemia, it approaches unity. After 24 hours the height of the red cell column ( $v$ ) is measured and compared with the total contents of the tube ( $V$ ), the volumetric index being calculated from the

formula  $\frac{V}{v} \times 100$ .

In normal horses the index is about 35 but in anaemic animals it decreases. If a thin layer of venous blood is collected on a white plate the red cells agglomerate, and are rapidly agglutinated (less than 1 min).

The article also gives instructions for the collection of blood samples and smears for transmission to a laboratory.—U. F. RICHARDSON.

BLANC, R. (1947.) La lutte contre la peste bovine au Cameroun. [Control of rinderpest in the French Cameroons.]—*Bull. Acad. vét. Fr.* 20. 288-296. 889

The measures to control rinderpest in the French Cameroons from 1918-1947 are briefly

described. Until 1929 the only sanitary measures adopted were isolation of the sick and burning of carcasses. The use of formolized tissue vaccine was started in 1929 but it was not until 1934 that a laboratory was provided to prepare vaccine on any large scale. From 1931 onwards the number of animals vaccinated increased rapidly from 3,581 in 1931 to 213,913 in 1944.

By the use of the formolized vaccine the disease was brought under control but was by no means eradicated.

From 1945 the use of formolized vaccine was abandoned and goat virus obtained from Nigeria was used in its place.

At first the goat virus was used on cattle which had previously been vaccinated with formolized tissue vaccine, however, after preliminary trials on small numbers of non-vaccinated cattle the goat virus alone without preliminary inoculation of formolized vaccine was used.

The results are given in some detail. Mortality following inoculation with goat virus—in the dry season mortality due to the goat virus was about 0.36% and during the rainy season about 1.8% but in one area it rose to 4.4%.

The results are considered to be satisfactory and the method has practical advantages over the formolized tissue vaccine especially in its lower cost. It was found that certain breeds of goats were very resistant and such breeds are unsuitable for use as virus producers.—M. C.

KWONG, F. J., & LEE, C. T. (1947.) [Studies on the lapinized rinderpest virus strain III: I. Susceptibility of pure-bred dairy cattle.]—*Chin. J. anim. Husb.* 6. Nos. 5, 6 & 7. 28-26. 890

A total of 951 pure-bred dairy cattle, belonging to four breeds, namely Holstein, Jersey, Ayrshire and Shorthorn, was inoculated subcutaneously with the lapinized rinderpest virus Strain III, as a 1% spleen and lymph node emulsion. In general, the cattle reacted only slightly; of the four breeds the most susceptible being the Jersey. Of the 951 cattle, 150 were in advanced pregnancy, and there was only a single case of abortion, the cause of which appeared to have no relation to vaccination. Temporary reduction of milk yield was an outstanding feature. Emaciated animals and 1-3 months old calves showed severer reaction. There was only a single death, which was due to pneumonia.

—S. J. CHU.

WALKER, R. V. L. (1947.) Rinderpest studies. Attenuation of the rabbit adapted strain of rinderpest virus.—*Canad. J. comp. Med.* 11. 11-16. [French summary.] 891

Baker's rabbit-adapted or "lapinized" strain of rinderpest virus, which was virulent for cattle,

was passed through eggs. The virus was found to be attenuated in the 29th yolk sac passage. A lyophilized vaccine prepared from fluids of that passage produced immunity in a calf against the bovine strain of virus and in rabbits against the lapinized strain. A vaccine prepared from the 36th passage failed either to infect or to produce immunity in a calf. It was thought that the virus was accidentally inactivated between these passages.—P. J. G. PLUMMER.

\*GYARMATI, F. (1944.) [Statistics of dog distemper during 10 years at the Budapest University Clinic.]—*Állatorv. Lapok.* 67. No. 6. Abst. from abst. in *Tierärztl. Z.* No. 2. p. 29. (1944.)

892

20-30% of the dogs presented at the small-animal clinic were affected. Of these, 67-81% showed the catarrhal form of the disease, and 3-26% the nervous form. Since 1937, under specific serum therapy as well as symptomatic treatment, the recovery rate rose from 38.04 to 67.85%.—E. COTCHIN.

GORET, P., & YVORE, G. (1947.) Note sur le virus de Carré adapté au Furet. Son emploi dans la vaccination du chien (méthode de Green). [Ferret-adapted distemper vaccine.]—*C. R. Soc. Biol. Paris.* 141. 932-934. 893

The authors refer briefly to results obtained in the U.S.A. by Green [see *V. B.* 17. 133] with a ferret adapted strain of distemper virus as an immunizing agent for foxes and dogs. They state that Green's virus obtained from the U.S.A. has been used in France with success by some practitioners. They have studied ferret-adapted virus using both Green's strain and a French strain which had 60 passages in ferrets. The French strain in a dose of 20 mg. of spleen was used to vaccinate 150 dogs of which four had severe reactions, 17 developed distemper and of these nine died in spite of treatment. The authors conclude that this French strain is not yet sufficiently attenuated for general use.

Green's strain obtained from U.S.A. and tested in the laboratory on 16 puppies in varying doses gave consistently good results.

This strain when passed through French ferrets and used in the field on 260 dogs in a dose of 20 mg. and on 250 in a dose of 15 mg. gave results very similar to those obtained with the French strain. That is about 10% developed severe clinical distemper as a result of inoculation.

It was considered possible that the dosage was too high. A lower dose, namely 10 mg., was used on 340 dogs. With this dosage better results were obtained, only 2% of the dogs developing clinical distemper. Following this trial more than

5,000 dogs have been vaccinated by practitioners with satisfactory results.—M. C.

CURNEN, E. C., PICKELS, E. G., & HORSFALL, F. I., Jr. (1947.) Centrifugation studies on pneumonia virus of mice (PVM). The relative sizes of free and combined virus.—*J. exp. Med.* 85. 23-38. [Authors' summary copied verbatim.] **894**

A technique has been devised for obtaining free or uncombined pneumonia virus of mice (PVM). Free PVM, liberated from infected mouse lungs by means of this technique, is infectious and causes haemagglutination directly. The results of quantitative studies carried out in the high speed angle centrifuge indicate that the free virus is relatively small, with dimensions of the order of 40 millimicrons. When it is in combination with lung tissue particles, PVM appears to be a relatively large virus with minimal dimensions of the order of 140 millimicrons. Non-infectious virus particles, released from combination with lung tissue particles by heating, are similar to the infectious free virus in size.

VOLKERT, M., & HORSFALL, F. L., Jr. (1947.) Studies on a lung tissue component which combines with pneumonia virus of mice (PVM).—*J. exp. Med.* 86. 393-407. [Authors' summary copied verbatim.] **895**

Evidence has been obtained which indicates that the lung tissues of mammalian species susceptible to infection with PVM contain a specific component which combines with the virus. The concentration of this tissue component appears to be directly proportional to the susceptibility of the species; in its absence infection with PVM cannot be established. The available evidence suggests that the presence of the virus-combining component in lung tissue may play a decisive role in the initiation of infection with this pneumotropic virus.

BRANDLY, C. A., HANSON, R. P., LEWIS, S. H., WINSLOW, N. S., HOYT, H. H., PRITCHARD, W. R., & NERLINGER, C. M. (1947.) Variables and correlations in laboratory procedures for Newcastle Disease diagnosis.—*Cornell Vet.* 37. 324-336. **896**

Ten strains of egg propagated Newcastle disease virus were shown to have comparable agglutination titres for fowl erythrocytes. Numerous serial passages in eggs did not affect this capacity of the virus.

Inoculation of eggs by the allantoic cavity and intravenous routes produced high titre virus in the embryonic fluids. Inoculation into the yolk sac and on the chorio-allantoic membrane was not satisfactory. Red cells of different chickens

showed variation in their susceptibility to agglutination by Newcastle disease virus.

Haemagglutination-inhibition tests were performed with 167 sera by two methods: constant virus with successive dilutions of serum, and constant serum with successive dilutions of virus. There was a 98% agreement between the results of the two methods of testing. The haemagglutination-inhibition and serum neutralization titres of experimentally infected fowls showed a close correlation. This was particularly evident during the ascending phase of immunity. During the descending phase inhibiting antibody disappeared first. It was not possible to identify the "antibodies" associated with haemagglutination-inhibition, virus neutralization, and refractivity to infection as a single entity.—F. D. ASPLIN.

KOMAROV, A., & GOLDSMIT, L. (1947.) The use of live viruses in Palestine for the vaccination of poultry against Newcastle Disease.—*Cornell Vet.* 37. 368-372. **897**

The relative immunizing efficacy of two strains of Newcastle disease virus was tested in field trials, using the Muktesar strain, apparently modified by serial passage in chicken eggs and the Haifa strain apparently modified by passage in duck eggs. The trials consisted of dividing flocks into equal parts, half the flock was injected, subcutaneously or intramuscularly, with diluted amino-allantoic fluid of embryos infected with the Haifa strain and the other with the Muktesar strain.

Seventeen flocks of 8-10-week-old pullets were vaccinated. The Muktesar strain caused a check in growth rate, reduced appetite, partial moult and produced nervous disturbances in a proportion of inoculated chickens. In four trials with laying hens, the Muktesar strain resulted in a marked fall in egg production, general depression, loss of appetite and moulting. Some birds developed nervous symptoms. The Haifa strain did not affect productivity, feed consumption, growth rate nor did it induce moulting. Fewer birds developed nervous reactions. Immunity tests seven days to three months after vaccination showed the fowls to be refractory.—F. D. ASPLIN.

YATOM, J. (1946.) [An outbreak of conjunctivitis in man associated with the virus of Newcastle disease.]—*Refuah vet., Palestine.* 3. 69-70. [In Hebrew and English.] **898**

Seventeen women engaged in preparing for table chickens infected with Newcastle disease developed conjunctivitis. The incubation period was three days; acute symptoms lasted three days, finally disappearing after 10-14 days. There was no transfer from one human being to another and the epidemic stopped after infected poultry had

been destroyed. No attempt was made to isolate virus or demonstrate antibody. Laboratory infection of human beings by Newcastle disease virus has been described by BURNET, F. M. [see *V. B.* 14. 300].—F. D. ASPLIN.

ROSSI, F. A. (1944.) Enfermedad de heine medin y su relación con las parálisis aviarias. [Poliomyelitis and its relation to avian paralysis.]—*Rev. Med. Cienc.* 6. 713-719. [Abst. from author's English summary.] 899

During epidemics of poliomyelitis in 1942-43 R. studied fowl paralysis in the districts adjoining Buenos Aires. Although histologically there are resemblances between the lesions in the ventral horns of the spinal cord in both diseases no connection between the human and the avian disease could be established.

*See also absts. 1007* (drying of viruses); *1012-1024* (annual reports).

Among 12,000 people connected with poultry breeding and the poultry trade no case of poliomyelitis occurred.—M. C.

BOVARNICK, M., & DE BURGH, P. M. (1947.) Virus haemagglutination.—*Science.* 105. 550-552. 900

It has been found possible to prepare lipid extracts from red blood cells which are capable of inhibiting the haemagglutinating activity of certain viruses for these cells. The effect appeared to be due to the competitive combination of the extract with the virus and to be specific. On prolonged contact of the virus and inhibitor there was progressive inactivation of the inhibitor with the reappearance of haemagglutinative activity.

—F. D. ASPLIN.

## IMMUNITY

LEMÉTAYER, E., NICOL, L., JACOB, L., GIRARD, O., & CORVAZIER, R. (1946.) Immunité antitoxique diaplacentaire du poulain issu de juments immunisées. [Placental transmission of antitoxin in the mare.]—*C. R. Soc. Biol. Paris.* 140. 852-854. 901

LEMÉTAYER, E., NICOL, L., JACOB, L., GIRARD, O., & CORVAZIER, R. (1946.) Immunité antitoxique colostrale du poulain issu de juments immunisées. [Antitoxin in the colostrum of immunized mares.]—*Ibid.* 140. 854-856. 902

The authors found that diphtheria or tetanus antitoxin was transferred to the foal through the placenta only when the antitoxin level of the mare's

*See also absts. 830* (streptococcal antigens); *832* (anthrax vaccine); *834* and *835* (tuberculin desensitization); *851* (antigens emulsified in oil); *853-857* (brucellosis); *870* (c.f. test in trypanosomiasis); *877-879* (bovine trichomoniasis); *885* (fowl pox); *889-891* (rinderpest); *893* (dis-temper); *897* (Newcastle disease); *971* (tuberculin reaction); *973* (vascular defence); *1005* (anthrax vaccine); *869* (epizootic lymphangitis vaccine).

## PARASITES IN RELATION TO DISEASE [ARTHROPODS]

WILDE, J. K. H. (1947.) The maintenance of cattle under conditions of tsetse fly infestation in the field.—*J. comp. Path.* 57. 294-300. 903

153 cattle were moved into an area where bush clearing had reduced, but had not eliminated tsetse infestation. In order to assess the value of phenanthridinium 897 and stibophen, as curative and prophylactic agents, the animals were divided into five herds. In three of these herds individual animals were treated with 897 when infection was detected. In one herd animals showing trypanosomes were given stibophen twice at a week's interval. The fifth herd was divided into three groups, of which one group received stibophen, and one 897 at monthly intervals. Animals of the third group received 897 if found infected.

In the herds, in which animals were treated

serum was of the order of one unit per ml. or greater. Colostrum plays a more important part in the transference of antitoxic immunity to the foal than does placental transmission.

At the time of parturition there is a great concentration of antitoxin in the mare's colostrum to a higher titre than found in the blood. Once the mare is suckled the colostrum titre falls rapidly, while the serum antitoxin of the foal rises to a level similar to that of the mare's serum. The foal's serum antitoxin stays at this level for a certain time depending on the degree of immunity of the mare (about ten days in one experiment recorded) and then slowly diminishes.—R. C.

with 897 only after infection had occurred, the infection rate varied from 88% to 44.7%.

In the herd, in which infected animals were treated with two doses of stibophen, the infection rate was 90.9%. In the group treated at monthly intervals with stibophen, whether infected or not, the infection rate was 64.3%, and in that treated similarly with 897 only 28.6%.

During the 14 months of the experiment eight animals died, but these deaths are ascribed to anthrax, East Coast fever and blackquarter, and not to trypanosomiasis. The surviving cattle are said to have thrived. The trypanosomes encountered were *T. brucei*, *T. congolense* and *T. vivax*, but no information is given as to the relative prevalence of the three organisms. It is claimed that the experiment shows that prophylactic treatment

is more expensive than therapeutic treatment, and that if cattle are to be maintained by the use of drugs, treatment after infection would be the only economical method. [No animals were left as untreated controls.]—U. F. RICHARDSON.

RAO, V. V. (1947.) On gonotrophic discordance among certain Indian *Anopheles*.—*Indian J. Malar.* 1. 48-50. 904

Gonotrophic dissociation of certain *Anopheles* is the phenomenon described as disconnection of the functions of reproduction and nutrition, i.e., though mosquitoes continue to feed their sex activity is suspended. Gonotrophic concordance implies that the two functions are interdependent and simultaneous. The term gonotrophic discordance is applied to a condition midway between the two, in which ovarian development does not keep pace with nutrition but is dependent on repeated feeding. If such re-feeding occurs in nature, it has an important bearing on the transmission of malaria, since repeated re-feeding will increase the chances of infection. The occurrence of gonotrophic discordance may explain why during certain months mainly zoophilous species transmit malaria on a large scale.—F. C. MINETT.

WHITE, R. S. (1947.) On the anthropophilic indices of some *Anopheles* found in East Central India.—*Indian J. Malar.* 1. 111-119. 905

Based on precipitin tests of stomach contents using human and bovine anti-sera, the anthropophilic index has been worked out for five species of *Anopheles* caught in houses and cattle sheds in different localities. The results indicate the existence of biological races or crypto-species in *A. varuna*, *A. culicifacies*, *A. fluviatilis* and *A. minimus*. In the case of *A. varuna* the egg measurements indicate that these are separate races within the species. This is not the case with the other species mentioned above.—F. C. MINETT.

MILLER, J. K. (1947.) Ticks: carriers of diseases of man and animals.—*Cornell Vet.* 37. 121-128. 906

The author surveys the activities of ticks as carriers of disease, 15 species of which have been recorded in New York State. To these he adds *Dermacentor andersoni*, which may be infected by rickettsiae and which transmits the virus of Western Equine Encephalomyelitis; *Boophilus*

*See also absts. 873 and 874 (Ornithodoros moubata); 951 (Argas persicus); 955-957 (D.D.T.); 1008 (reduvid bugs); 1033 (textbook); 1029-1031 (index catalogue of zoology).*

*bovis* (or *annulatus*), a vector of *Babesia bigemina*, and *Ixodes holocyclus*, parasitic on domestic animals. "Tick paralysis" is discussed briefly. This occurs sporadically in man; at times it is widespread in wild and domestic animals. Paralysis occurs after the bites of gravid females with ripened eggs, a toxic agent (unidentified) having been obtained from macerated ticks and ripened eggs. Its action is on the central nervous system. Human beings are most frequently affected with "tick paralysis" after bites by *D. andersoni*, *D. variabilis*, and *Ixodes holocyclus*. When the ticks are removed from the host, recovery is usually rapid and complete. P.M. changes in the brain of a child and a sheep are indicated. Eradication of ticks over large areas has not been achieved. Tick-produced disease of domestic animals may be controlled by the use of insecticides such as D.D.T. and hexachlorocyclohexane, and by burning vegetation in which larval and nymphal stages seek cover. Ticks concentrate along the warmer, more humid coastal regions. Each species is selective in its preference of host-larvae and nymphs utilise small rodents, adults the larger mammalian hosts. The joint presence of small rodents and mammals is often essential to the abundant distribution of ticks in a given area. Man is purely an accidental host.—J. R. SCOTT.

VARENNE, H. (1946.) La gale bovine: son évolution et ses relations avec les gales sarcophtiques humaine et équine. [Sarcoptic mange in cattle].—*Rec. Méd. vét.* 122. 115-124. 907

An account is given of observations on several French farms in 1944-45 when sarcoptic mange in cattle had become a serious pest. Details are given of treatments that have been useful.

Attention is drawn to the frequent cases of transmission from cattle to men who handle the infected animals. Pustules appear on the hands and on the breasts of infected human beings, and cases were found in which babies had been infected with mange from their parents, which in turn had been infected from cattle. It is the opinion of the author that a species usually specific to cattle is involved, but that it is well adapted to infect human beings. It is considered certain that the sarcoptic mange-mite of horses is not involved.

—L. D.

## PARASITES IN RELATION TO DISEASE [HELMINTHS]

RAO, M. V. G. (1947.) Schistosomiasis among sheep and goats in Poona R.I.A.S.C. butchery.—*Indian vet. J.* 24. 11-13. 908

A report on the common occurrence of

cirrhosis of the liver of sheep and goats at a military abattoir in Poona. The causal parasite was identified as the blood fluke, *Schistosoma indicum*. The condition of infested sheep appeared

to be unaffected, whereas the goats were anaemic.

—F. C. MINETT.

CAWSTON, F. G. (1946.) Mechanical safeguard against Bilharzia. Destroying the parasites.—

*J. R. Army med. Cps.* 87. 177-179. 909

Bilharzia is prevalent in many parts of Southern Africa, and many attempts have been made to eradicate it. C. suggests that the parasite can be eliminated by mechanical means where there is need to make use of bilharzia-infected water. The method suggested consists in the use of a holding tank from which the water is either syphoned off or run off by gravity to the reservoir or swimming bath. Holding the water for 2-3 days prevents survival of cercariae.—M. C.

MUDALIAR, S. V. (1945.) Fatal enteritis in goats due to immature amphistomes, probably *Cotylophoron corylophorum*.—*Indian J. vet. Sci.*

15. 54-56. 910

Nineteen goats in a herd of 40 died. A few adults and some immature amphistomes were found in one at P.M. examination and were identified as *C. corylophorum*. The symptoms exhibited by the goats were general weakness, suspended feeding, dullness, inability to move about, and subcutaneous oedema especially beneath the jaw. The jaw swelling was more prominent in the mornings than later in the day. On the third day of the disease diarrhoea developed, with dark-coloured and offensive faeces. Death occurred in about 5-6 days. The recorded species of molluscs from the area were *Planorbis exustus*, *Limnea leuteola* and *Vivipara bengalensis*, but only *P. exustus* discharged cercariae resembling *Cercariae indicae*. M. discusses the confusion on the identity of the adult amphistome of *Cercariae indicae*.—M. K. SREENIVASAN.

LASNIER, E. P., & CASSINELLI, J. F. (1945.)

Diagnóstico de quiste hidatíco hialina (no roto) del pulmón mediante la inclusión de esputos. [The inclusion of sputum in the diagnosis of a pulmonary hydatid cyst.]—*Ann. Fac. Med.*, Montevideo. 30. 903. [Abst. in *Amer. Rev. Tuber.* 55. pp. 84-85 of absts. (1947), copied verbatim.] 911

The method of inclusion of sputum and staining with Best's carmin permits the diagnosis of hydatid disease before the rupture of the cyst, at a time when no scolices or hooks can be found in the sputum. This method was instrumental in arriving at a correct diagnosis of echinococcosis in 13 cases. In 12 of these cases the diagnosis was confirmed by surgical intervention; while in one case the rupture of the cyst occurred shortly after the sputum had been collected for examination. The chitinous external layer of the hydatid

cyst has a solid and resistant structure. When the adventitial reaction of the organ, which is the site of the disease, develops favorable conditions for infection, the products of the resulting inflammation disintegrate the outer layers of the chitinous membrane. In the case of the lung, or in other organs which have a natural canalicular outlet, the disintegrated fragments may be conveyed with the secretions to the exterior. This is the rationale on which Best's staining method is based. The adventitia represents the active reaction of the lung to the presence of the parasite. The virtual space between the adventitia and the chitinous membrane is soon converted into a real space as a consequence of the necrosis and of the inflammatory changes that take place in this area. Bronchogenic or hematogenous infection occurs and leads to suppuration. Bronchi may also be involved in the process and the damage suffered by their wall may cause perforation and drainage of the purulent material through the bronchial tree. This process is the anatomical substratum of the known "congestive episodes" in the course of hydatid disease of the lung. These episodes are characterized by fever, chest pain, increase in the amount of expectoration and hemoptysis. Roentgenologically there is an increase of the shadow of the cyst in the first phase, followed by the appearance of a gaseous layer around the cyst after the perforation of the bronchus and the elimination of the purulent material. Careful and repeated sputum examinations at the moment when these phenomena take place will lead to the correct diagnosis. The material derived from the chitinous membrane of the hydatid cyst is stained red with Best's carmin. Another characteristic of this material is the presence of phagocytic cells arranged in palisades around the hydatid structures. It is by no means easy always to reach a definite diagnostic conclusion based on the histological appearance because, besides hydatid derivatives, there may be present many other granular or filamentous Best-positive elements in the sputum. The shape and size, as well as the position of these particles, if carefully evaluated, will usually reveal their origin from the hydatid cyst, but it is emphasized that the finding of Best-positive particles has only value as a presumptive evidence of hydatid disease.

MATOFF, K. (1943.) Ueber die Verbreitung der Jungtrichinellen durch die Vena portae. [The spread of *Trichinella larvae* by the portal vein.]

—*Z. InfektKr. Haustiere.* 60. 113-142. 912

M. claims to have demonstrated, for the first time, the presence of *Trichinella* larvae in the portal veins of the rabbit and g. pig. They were also found in the hepatic veins, vena cava caudalis,

and the venous drainage of the large intestine. It seems that the greater proportion of *Trichinella* larvae enter the portal system *via* its intestinal tributaries and less *via* the gastric and splenic drainage. Localization of the region of the intestinal mucosa over which larvae entered the blood system was not possible from these observations. The discovery of larvae in the mesenteric lymph-nodes showed that the lymphatic system is also a distribution channel. Larvae were also found in the arterial supply of the brain and, since they were also found in the jugular veins, it is supposed that larvae may enter the capillary system of an organ, and, if they fail to break out of the blood

See also absts. 958 (trichostrongylosis); 1033 (textbook); 1029-1031 (index catalogue of zoology).

### SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

ISAKSSON, A. (1946.) Multipla karcinoider i tunntarmen hos nötkreatur. Kasuistiskt meddelande. [Multiple "carcinoids" in the small intestine of a bovine.]—*Skand. VetTidskr.* 36. 86-92. [Abst. from English summary.] 914

In an apparently healthy cow multiple primary tumours in the jejunum were found after slaughter. There was a clear macroscopic and microscopic resemblance to carcinoids in man.

—E. V. L.

BOYD, W. L., KARLSON, A. G., JASPER, D. E., SELLERS, A. F., & COLLIER, J. R. (1947.) Leucemic lymphoblastoma in a cow with involvement of the udder.—*Amer. J. vet. Res.* 8. 380-387. 915

An interesting case of an atypical form of leukaemia in a mature Guernsey cow is described. Lesions were found in the lymph nodes, the genital tract, the mammary gland, the heart, lungs, liver, spleen, kidneys, the gastro-intestinal tract and parts of the diaphragm.

*Ante-mortem* blood examinations revealed a lymphatic leukaemia. The majority of the non-granular cells present were of a primitive nature and were regarded as lymphoblasts. The authors describe the gross and microscopic pathology of the lesions and discuss the classification and nomenclature of this case.—A. R. JENNINGS.

ALEXANDER, C. M., & CHU, F. (1947.) Pulmonary adenomatosis complicated by lobar pneumonia.—*Arch. Path.* 43. 92-101. 916

This article is a full record of one case of pulmonary adenomatosis, published because of the rarity of the condition. Anatomically it resembled jagsiekte, but the tumour cells themselves were tall, columnar epithelium in which mucin production was a prominent feature. The authors express

vessels, leave the organ by its venous drainage.

—LEWIS DAVIES.

KOFFMAN, M. (1946.) Bidrag till kännedomen om elefantparasiter. [Some parasites of elephants.]—*Skand. VetTidskr.* 36. 161-172. [Abst. from English summary.] 913

The parasites from the bile ducts and duodenum of a 17-years-old Indian elephant were identified as *Grammocephalus clathratus* and *Gr. varedatus*. This genus has not previously been observed in Sweden and the elephant, which had been in Sweden for ten years, had harboured the parasites despite the great change in climatic conditions.—E. V. L.

their views on the relationship between the two diseases thus:—

"No person with pulmonary adenomatosis has ever been proved to have been exposed to diseased sheep, and most cases of human adenomatosis have been reported in localities where the ovine disease is unknown. Thus, while a symptomatic and anatomic similarity exists between human and ovine adenomatosis, there is no evidence that the two diseases have a common cause." [For details of "jagsiekte", see *V. B.* 9. 104.]—L. M. MARKSON.

COMAN, D. R. (1947.) Mechanism of the invasiveness of cancer.—*Science.* 105. 347-348. 917

Experimental evidence indicates that the invasiveness of cancer cells is dependent upon one or more of the following factors:—(i) A decreased adhesiveness of the cells which facilitates the separation of groups and individual cells; this is said to be due to a local deficiency of calcium. (ii) Active amoeboid movements of the cells. (iii) The liberation of hyaluronidase and the opening up of the intercellular cement substance; there is little, if any, evidence that this does occur. It has yet to be proved that the cancer cell produces or contains hyaluronidase.—A. R. JENNINGS.

POTTER, V. R. (1945.) The role of nutrition in cancer prevention.—*Science.* 101. 105-109. 918

Studies on the experimental production of cancer in animals have revealed three stages of gradual changes preceding the actual eruption of malignant growths (a) the induction period, resulting from radiations, carcinogenic substances, heredity, and viruses (b) the critical period, resulting from the effects of irritation, injury, high

calorie intake and lack of exercise, and (c) the period of regression, the result of release from the restraint of normal cells. The first stage is well standardized from the experimental standpoint. During the second, the critical period, nutrition may play a very important part since work on mice has shown that by restricting the food intake to bare maintenance requirements and by enforced exercise the development of induced cancers has been retarded or actually arrested. Various injuries such as cuts, irritations or burns in the neighbourhood of potential cancer cells are likely to complete the sequence of events culminating in cancer, irrespective of the plane of nutrition, and the beneficial effects of nutritional measures to prevent cancer during the critical period would be greatest in the absence of chronic irritations. The relationship of the restraint by normal cells upon malignant growth development may be enzymatic in nature as the suppression of tumour growth by normal cells must occur through the operation of mechanisms by which normal cells suppress their own growth when this is desirable. This theme is then developed with the suggestion that cancer may be due to an abnormal protein lacking the catalytic power of the normal aerobic enzyme protein, and that it occurs either as a result of heredity or of the action of carcinogenic agents upon the normal enzymes. A theory for the mechanism of cancer formation is then propounded, and the relationship of nutrition to the process is amplified.

P. concludes with the statement that the cancer problem is susceptible to experimental study and that the problem may resolve itself into restricting one's food consumption to maintenance level, keeping physically fit and eliminating chronic irritations with medical assistance. The body reacts to various difficult situations by improving its metabolic efficiency, and the latter at its maximum appears to be related to decreased

degenerative disease; hence the problem before the human race is how to improve its external environment without weakening its internal milieu.—A. EDEN.

**FIGGE, F. H. J. (1947.) Cosmic radiation and cancer.**—*Science*. **105**. 323-325. 919

Preliminary experiments are described as a possible means of assessing the part played by cosmic radiation in carcinogenesis. The basis of this experiment was an attempt to intensify cosmic rays and compare the resultant carcinogenesis in mice with that produced in mice subjected to normal atmospheric radiation. Methylcholanthrene was the chemical carcinogen used and the cosmic radiation was intensified by means of lead plates. The author states that "the rate of production of cancer in mice kept under lead plates was consistently higher than that of the controls."

—A. R. JENNINGS.

**DRIEUX, H. (1946.) Quelques essais de traitement du cancer chez les animaux domestiques.**—  
[Treatment of cancer in domestic animals.]—  
*Rev. Path. Comp.* **46**. 438-444. 920

This is a short summary of the methods used by various workers in the attempted treatment of cancer in animals.—A. R. JENNINGS.

**HUGGINS, C. (1947.) Androgen and anaplasia.**—  
—*Yale J. Biol. Med.* **19**. 819-830. [Author's summary and conclusion copied *verbatim*.] 921

Androgen has a profound effect on many neoplasms, ranging from inhibition of the development of tumors to a stimulation of cancerous growth. Many of the effects are explainable by present knowledge of the physiological effects of androgen on cells. The anti-androgenic therapy of cancer of the prostate demonstrates that a chemical change in the internal environment of the host may bring about rapid and long-continued regression of a malignant epithelial process.

#### NUTRITIONAL AND METABOLIC DISORDERS

**BRUCE, H. M., & PARKES, A. S. (1947.) Feeding and breeding laboratory animals. III. Observations on the feeding of guinea-pigs.**—*J. Hyg., Camb.* **45**. 70-87. [For parts I & II, see *V. B.* **17**. 348.] 922

The aim of evolving a dry pelleted stable diet completely adequate for g. pigs has not yet been achieved, but a diet is described which was not apparently deficient in any required factor other than vitamin C, and which proved very satisfactory for the growth and maintenance of the animals when supplemented with ascorbic acid, or with fresh greenstuff, or dehydrated cabbage.

—E. COTCHIN.

**SCHORMÜLLER, J. (1944.) Über die Eiweissstoffe des Fleisches.**—  
[Meat proteins.]—*Z. Veterinärk.* **56**. 235-246. 923

The chemical and physico-chemical properties of meat proteins have been reviewed. Meat contains about 76% water, 1% minerals, 21.5% nitrogenous matter, and 1.5% fats. The main inorganic substances consist of potassium, sodium, iron, calcium, magnesium, phosphorus and chlorine. Nitrogen-containing substances include creatin, combined with phosphoric acid, carnitin, carnosin, purines, acetyl choline, muscle adenylic acid and others. The chief carbohydrate is glycogen. Four distinct proteins have been

recognized. Myogen, a muscle albumin, soluble in water, coagulates at 55–65°C. and is precipitated by ammonium sulphate in concentrated solution. It changes on standing into myogen fibrin which behaves like a globulin. Myosin, the chief protein of muscle, also behaves as a globulin, but differs from other globulins by its content of lipoids which are free from phosphorus. Myosin coagulates at 46–51°C. and changes on standing into myosin fibrin. Globulin X and myoalbumin are the other two proteins. The amino acids of muscle proteins have been analysed and no particular difference has been found between the individual fractions.—E. KODICEK.

KOMAROV, N. I. (1940.) Vliyanie povyshennoi normy belka na kachestvo bykov. [Influence of increased protein content of feed on the quality of bull semen.]—*Iskusst. Osemensel'khoz. Zhivotn.* 1. 69–69. 924

Details of the diet for control and experimental animals during the preparatory and experimental period are given. The experimental animals received 100% more protein than the control animals.

Hay and oats were combined to meet nutritional requirements during the preparatory period, but were not given according to live weight. The animals were most probably slightly underfed.

During the experiment feeding was proportional to live weight and work. The rations were a combination of hay, oats, sunflower cake, pea meal and blood meal. The hay was later replaced by green grass.

No increase in the quality of semen was obtained by a 100% increase of protein, but Komarov points out that regularity in feeding, exercise, care and use had a beneficial influence on the sexual function of bulls. Sufficient food for the maintenance of condition and productivity, supplemented by concentrated food, had a stimulating effect on the quality of the semen. The quality of the semen slightly improved in experimental as well as control animals, owing to their being slightly underfed during the preparatory period. It is recommended that bulls should be fed a normal balanced ration according to their live weight at least 1–1½ months before being used for breeding purposes.—K. A. ALLEN.

*See also absts. 918 (relation to cancer); 972 (copper and iron content of blood of cows); 1001 and 1002 (subterranean clover); 1012-1024 (annual reports).*

DUNLOP, G. (1947.) Infertility of cows on upland grazings.—*Agric., Lond.* 53. 582–587. 925

Breeding herds of beef cattle on hill grazings in Scotland had wide variations in the percentage of calves produced. Of six herds cited by D., five gave between 50–70 calves per 100 cows and only one, giving about 85%, was satisfactory.

From investigation, the bulls concerned were not at fault. Many animals had symptoms of mineral deficiency, including depraved appetite, osteophagia, and absence of oestrus. Soil and pasture analyses indicated a low  $P_2O_5$  content, herbage (dry matter) containing 0.38%  $P_2O_5$ . Blood samples were not available for P estimations.

A commercial mineral mixture containing 50% bone flour was offered *ad lib.* during the breeding season to several groups of cows, numbers not stated. Control groups were denied access to this mineral mixture. During the first month about two pounds of mixture per cow per day were consumed, after which consumption rapidly declined. The general condition of animals improved and almost all females developed oestrus within one month. Deficiency symptoms occurred in control animals as in previous years, but not in treated animals. The calf crop remained low for controls but rose to normal levels for treated cows.

Most cases concerned land which was used only for sheep-grazing. That the sheep were not significantly affected is confirmation that they require relatively less dietary P than cattle.

—R. F.

KENNEDY, A. H. (1947.) Nutritional anaemia in mink.—*Canad. J. comp. Med.* 11. 272–275. 926

Formerly the disease was common, it disappeared when preventive measures were taken. It is again reappearing due possibly to the difficulty of obtaining certain feed requirements. Liver has been found to be the ingredient most useful in preventing the disease. One-half ounce per day is well within the minimum amount necessary to prevent its occurrence. Tomato juice may give a temporary improvement in the early stages but symptoms reappear in spite of the quantity given.—P. J. G. PLUMMER.

## DISEASES, GENERAL

DALLING, T. (1946.) Diseases of animals.—*J. agric. Soc.* 107. pp. 16–80. 927

Recent work on bovine mastitis, Johne's disease, salmonellosis in fowls, lead, copper, salt, fluorine and castor bean poisoning, contagious

abortion and digestive disorders in cattle is summarized. Dealing with mastitis treatment with such agents as acriflavine, silver oxide, sulphamylamide, tyrothricin, gramicidin and penicillin is discussed. The use of a vaccine consisting of a

suspension of organisms in liquid paraffin with powdered pumice stone for prevention of Johne's disease in sheep and the possible relationship with cobalt deficiency is mentioned. The extension of the range of *Salmonella* spp. infecting poultry in Gt. Britain during recent years and the method by which new species have been introduced are discussed.—M. C.

HOFLUND, S. (1947.) Some veterinary problems of Sweden.—*J. S. Afr. vet. med. Ass.* 18. 67-70. 928

This is a brief account of the climate, methods of husbandry and the more important diseases of livestock in Sweden. There are few protozoan or virus diseases.

Bovine TB. is well controlled, the country being divided into free, protected and infected areas. Only about one-quarter of Sweden is now classed as infected. Contagious abortion is dealt with on the same lines as TB. The ring test is used for examining bulk samples of milk. Calfhood vaccination is general in infected herds. In many areas the soil is deficient in phosphorus, in such areas arthritis occurs in high yielding cows unless phosphorus supplements are fed. During the war paper pulp was used for feeding cattle and horses, the pulp was readily digested if mixed with 9% molasses, some soyabean and a mineral mixture containing salt, calcium carbonate, dicalcium phosphate and sodium phosphate. It was found that while calcium phosphate could be utilized by the cattle it could not be utilized by ruminal organisms, a soluble form such as sodium phosphate was necessary to maintain cellulose digestion.

In studies of ruminant digestion on sheep and cattle fed with paper pulp it was found that removal of the molasses or the soluble phosphate caused disappearance of yeasts from the rumen and later the cellulose-splitting cocci also died out.

A disease called "Skavelsjuka" characterized by loss of appetite and emaciation occurs in cattle in winter in certain areas. The cause is considered to be the death of the ruminal yeasts. Treatment consists in drenching the cattle with ruminal contents of healthy cattle and supplementing the diet with molasses and soluble phosphate.—M. C.

RUBARTH, S. (1948.) Plötsliga dödsfall hos häst och deras samband med fokalinfektioner. [Sudden death in horses and its connection with focal infection.]—*Svenska Militärvet. Kvartals-skr.* No. 3-4. pp. 1-16. [German summary.] Reprinted in *Medd. Veterinärhögsk. Stockh.* No. 17. (1948.) 929

Five case records of sudden death in horses are given, four of them dying during moderate exercise and the fifth immediately after receiving an injection of joint-ill antiserum. The four cases

showed on P.M. examination dilatation of the heart with haemorrhages in the respiratory organs and chest and also retropharyngeal abscesses.

The antiserum which killed one horse was found on test to contain a toxic substance, but the serum was believed only to have had a trigger effect. The pathogenesis is discussed.—J. E.

BERTHELON, M. (1944.) Première observation d'hémoglobinémie puerpérale chez la jument. [Puerperal haemoglobinaemia in a mare.]—*Rev. Méd. vét., Lyon et Toulouse.* 95. 145-149. 930

Details are given of a fatal post-parturient illness in a thoroughbred mare, about 12 years of age, accompanied by abdominal pain, increased frequency of micturition, icterus and haemoglobinuria; bacteria with the morphology of anaerobes were found in blood smears. Acute peritonitis was found at autopsy, but no bacteriological examination was made. Gangrenous peritonitis had occurred previously in two horses on the same premises, one case following a normal parturition, and the other a careful rectal examination.—E. COTCHIN.

MOULE, G. R. (1947.) "Birdsville disease" of horses.—*Aust. vet. J.* 23. 65-69. 931

A disease affecting horses of all ages and both sexes in Western Queensland is described. The disease runs an acute course for 7-10 days and some animals die during this period. Recovery is never complete and convalescence is long. Drowsiness and immobility are the chief symptoms, accompanied by discharges from eyes and nose and emaciation is rapid. Other symptoms are laboured breathing, severe inco-ordination and wearing of the front surface of the hooves of the hind feet due to dragging the feet along the ground. At the canter inco-ordination is so severe that the horse falls backwards. Chronic cases show persistent inco-ordination and sometimes are "roarers". At P.M. examination heavy parasite infestations and also liver abnormalities are encountered. No pathological work has been done.

Outbreaks are sporadic and although the disease is more common in horses grazing on herbaceous pastures on red sand-hills in areas of low rainfall (about 10 inches per annum), no relation to climatic conditions is apparent.

—D. C. BLOOD.

JACQUET, J., & HABERT, H. (1943.) Étude d'une petite enzootie de meningo-encephalo-myélite du cheval dans une même exploitation. [A small outbreak of equine meningo-encephalo-myelitis on one farm.]—*Cah. Méd. vét.* 13. 38-39. 932

In 1941, and still more in 1942, there was an

increasing tendency for cases of the disease to recur in the same districts, or even on the same farms. As an example, clinical details are given of the disease in three mares—daughter, mother and grandmother—affected at succeeding intervals of 1½ and 2 months respectively. The first two animals died, but the third recovered after treatment with M & B 693 (sulphapyridine): in discussing this result, the authors mention that in other cases of the disease they have found short-chain streptococci in the brain and bone marrow of affected animals. The disease ran an afebrile course, with yawning, salivation, intestinal paralysis, a characteristic carrot-red colour of the conjunctiva, and nervous symptoms, either of excitement or lethargy. A marked feature clinically was a permanent contraction of the muscles in the hypochondriac region. The presence of meningitis was confirmed histologically in the second case.—E. COTCHIN.

OLAFSON, P. (1947.) **Hyperkeratosis (X disease) of cattle.**—*Cornell Vet.* 37. 279-291. 933

An account is given of a disease of cattle, the first cases of which were encountered in 1941; between 1941 and 1946 three outbreaks were seen and in 1947 eight herds in New York State, Northern Pennsylvania and Maryland were affected. Cases occurred in late winter and spring and young stock were more frequently affected than adults.

The condition is chronic, extending over several weeks to three months or more.

In the early stages watery discharge from the eyes and nose has been reported by the owners. This is followed by loss of condition, poor appetite, depression and progressive thickening of the skin. The hair is lost and the skin becomes dry, leathery and deeply creased especially on the withers, neck, cheeks and the back.

There is no itching. Diarrhoea was sometimes present especially in the terminal stages. There was no rise of temperature. Most of the affected animals became emaciated and finally died. The lesions consisted of thickening of the skin with loss of hair, and histological examination showed an accumulation of keratinized material. The mouth, tongue, oesophagus and occasionally the omasum had raised, rounded papillary proliferations of the mucous membranes and underlying connective tissues. The cheek papillae were rounded and flattened. In the bile ducts nodular mucoid proliferations were common and there was fibrosis of the liver. The kidneys in some cases were enlarged and pale with whitish streaks in the cortex. Flat ulcers were occasionally present in the abomasum and the mucosa of the caecum and colon were sometimes thickened. Twenty cattle were used for transmission experiments but

in no case was experimental infection produced.

The disease has been confused with the virus diarrhoea of cattle described by OLAFSON, MACCALLUM & Fox [see *V. B.* 17. 186] but differs from it in its chronic nature, high mortality and in the hyperkeratosis.

The cause is unknown and no treatment tried so far has been of any value.—M. C.

BUENO, P. (1946.) *Sobre casos de morte súbita em suinos. [Sudden deaths in swine.]*—*Bol. Soc. paul. Med. vet.* 7. 171-177. [English summary.] 934

During an experiment on various avitamines in swine, six pigs kept on a vitamin-free diet died suddenly, after maintaining apparent good health for 2-3 months. The diet in question was manioc flour, meat meal, purified casein and a mineral mixture. Three pigs died without symptoms, and P.M. examination revealed congestion of the thoracic and abdominal organs, with nasal haemorrhage in two cases. In three cases there was marked subdural haemorrhage. The fourth pig showed locomotor-ataxia followed by coma and was slaughtered. This had acute softening of the grey matter in the anterior third of the medulla. The remaining two pigs died later, equally suddenly, and P.M. examination revealed congestion of the cerebral and meningeal blood vessels. The other pigs showed none of these signs on diets lacking one vitamin only.

—R. MACGREGOR.

BRINCK, P. (1944.) *Resultatet av en undersökning av parasit- och tuberkulosförekomsten hos hundarna i Malmö stad. [Results of a survey into occurrence of parasites and tuberculosis in dogs of Malmö.]*—*Skand. VetTidskr.* 34. 685-695. [Abst. from English summary.] 935

Details are given of the coccidia, cestodes and nematodes found at P.M. examination of 181 dogs in Malmö; there was no case of tuberculosis. The parasites found in 91 sick dogs in the province of Malmöhus are also listed.—E. V. L.

KING, H. D. (1939.) **Labyrinthitis in the rat and a method for its control.**—*Anat. Rec.* 74. 215-222. 936

Earlier investigations into middle ear disease in rats have failed to determine the aetiology. None of the bacteria isolated, nor vitamin or mineral deficiencies appear to be responsible. One form of ear infection is described but no attempt is made to investigate its aetiology. The clinical and P.M. findings are given and indicate infection of one or both labyrinths. The affected animals first tilt the head to one side, later move with the head close to the floor and run in a curve instead of a straight line. If held up

by the tail the body invariably rotates rapidly. The disease appeared suddenly in an albino strain inbred for nine years and during a period of unfavourable nutritive conditions. Captive grey rats seldom exhibit the disease and the colony available was found free from it. Following the suggestion of previous workers that infection was transmitted from mother to offspring during the suckling period, these disease-free greys were used as foster-mothers. Labyrinthitis still appeared in the young and also in two of the 100 foster-mothers to albino young which had remained with their own mothers a few hours after birth. Subsequently, therefore, only labyrinthitis-free albinos from the strain were used

*See also absts. 1012-1048 (annual reports).*

for breeding and their young, with placenta still attached, given to the greys as foster-mothers. By this method the disease was eliminated from the albino colony. At the same time the incidence of pneumonia, prevalent in both albinos and greys, was unaffected. It is suggested that the unknown causative organism may be among rare types commonly associated with middle ear disease and that it is the only one capable of penetrating to the labyrinth. When present in the bacterial flora of the upper part of the respiratory tract of a female it might be transmitted following parturition when the young are cleaned. But other routes of infection must occur because of the incidence of sporadic cases.—R. A. GREEN.

## POISONS AND POISONING

BLASER, E. (1946.) Ein Beitrag zur Kenntnis der Schwefelwasserstoffvergiftung beim Tier durch Jauchegase. [Poisoning of animals with sulphuretted hydrogen developed from the decomposition of manure.]—*Schweiz. Arch. Tierheilk.* 88. 401-413 & 433-446. 937

B. reviews the literature of  $H_2S$  poisoning in human and veterinary medicine.  $H_2S$  has been said to be produced by fermentation and putrefaction of organic compounds containing sulphur. According to Rodenacker-Warburg (1927) the  $H_2S$  in the inspired air combines with catalytic iron in the blood to form iron sulphide which prevents the supply of oxygen to the cells and thus leads to "internal asphyxia". B. records the conditions in which two horses died as a result of gases from a manure pit entering their stable *via* the liquid manure exit. In the present case a large manure pit was immediately adjoining outside the stable wall, the urine from the stable running through a plugged hole in the floor into the pit. Periodically the contents of the pit were agitated by a mechanical stirring device and this had been used on the day in question. On that day the plug was missing and it is stated that as a consequence of the aerodynamic conditions, gases from the pit were sucked into the stable through the hole. P.M. findings were non-coagulation of the blood, haemorrhage under the endocardium and in the larynx, oedema of the lungs, toxic changes in the liver, kidneys and spleen, hyperaemia and oedema of the digestive tract and oedema of the pia mater. By spectroscopic examination  $H_2S$  could not be demonstrated in the blood or in the tissues of the lung.

Conditions in the stable were tested on other animals, *viz.*, a rabbit, four g. pigs, two mice, two pigeons and one hen. When the conditions of ventilation were similar to those in which the

horses became sick, some of the test animals died and on P.M. examination all had typical macroscopic and histological changes, especially the latter, in their organs, characteristic of severe intoxication. The clinical signs were similar to those in the horses, dyspnoea, cyanosis, nasal discharge, apathy, decrease of reflex activity and convulsions.

When the drain in the floor was closed, the concentration of  $H_2S$  in the air of the stable was about 0.0085% ; when uncovered, the  $H_2S$  concentration was about 0.024-0.04%, definitely dangerous to life. The figures for  $NH_3$  concentration were below those likely to cause irritation of the nasal mucosa, and the  $CO_2$  concentrations were within admissible limits.

Hofmann has given the following figures in stables containing liquid manure pits:— $CO_2$  content, 2-3% ;  $NH_3$  content, 0.11-0.2% ;  $H_2S$  content, 0.11-0.3%. In stables with external liquid manure pits:— $CO_2$  content, 2% ;  $NH_3$  content, 0.05-0.2% ;  $H_2S$  content, found only in one-third of the cases and in amounts varying from 0.001-0.1%. When the liquid manure is stirred in such a stable the  $CO_2$  content is doubled, the  $NH_3$  content is trebled and the  $H_2S$  content becomes tenfold.—P. SASSE.

PIELOU, D. P. (1946.) Lethal effects of D.D.T. on young fish. [Correspondence.]—*Nature, Lond.* 158. 378. 938

The effects of a solution of 5.2% D.D.T. in paraffin were tried on young fish (*Jafue bream—Tilapia kafuensis*). It was found that toxicity depended on the experimental conditions. In clear water in pint jars, with one fish in each, all fish died in one day when the water contained a dose equivalent to 1 oz. per acre (1 : 18 millions) and in 4-5 days with 0.25 oz. D.D.T. per acre,

In the presence of slight weed growth all fish died at a concentration of one oz. per acre (1: 48 millions) and none at 0.83 oz. per acre. But in very muddy fish-pools about 2 ft. deep, with large weed growth, a dose of 3 oz. per acre (1: 25 millions) had to be used before any deaths were recorded and then 70% died in four days. This last dose is within the range used in anti-mosquito measures.—N. SABA.

WALLER, E. F., PRINCE, F. S., HODGDON, A. R., & COLOVOS, N. F. (1944.) Sensitive-fern poisoning of horses.—*Tech. Bull. N.H. agric. Exp. Sta.* No. 83. pp. 8. 939

As poisoning of horses from the continued ingestion of "sensitive-fern" (*Onoclea sensibilis*) may result, toxicity trials were made on three horses, one as control, two receiving hay containing 15–20% of sensitive fern. In one horse receiving the plant there were nervous symptoms after a period of six weeks, followed by inability to stand. Temperature and pulse remained normal. For 48 hours before the animal was killed no faeces were passed. At necropsy, the only gross lesions were extreme icterus, paralysis of the alimentary tract, enlargement of the liver, with cloudy swelling and fatty infiltration. There was extensive oedema of the brain with numerous haemorrhages into the brain tissue and degeneration of the neuron cells, with the resultant invasion of the Glia cells. The second horse developed hyperesthesia but no lesions could be observed in the skin. This condition lasted for about four weeks, finally disappearing.

In two field cases there were brain lesions essentially the same as those observed in the experimental animal.—H. PAVER.

RAINEY, J. W. (1947.) Hydrocyanic acid  
See also absts. 966 (arsenic); 1001 and 1002 (subterranean clover).

## PHARMACOLOGY AND THERAPEUTICS

KOMAROV, N. I. (1940.) O vliyanii prolan na polovuyu funktsiyu bykov. [Effect of prolan on the sexual function of bulls.]—*Iskusst. Osemensel'khoz. Zhivotn.* 1. 70–74. 942

Four bulls in good physical condition were chosen. The experimental time was divided into a preparatory (34 days) and an experimental period (45 days). During both periods the living, working and feeding conditions were the same for all animals. The animals were twice daily groomed, exercised and watered and fed three times a day. Two services were made in the day, for the rest of the time the animals were tethered by a 25 m. long rope (4–6 hours daily).

Two of the bulls were chosen as controls, the other two received injections of prolan, 5 mg.

poisoning from *Poa aquatica*.—*Aust. vet. J.* 22. 187. 940

Deaths occurred in a herd of dairy cows which had broken into a paddock containing a luxuriant growth of *P. aquatica*. The season was very dry and the herd had previously been fed on turnips and clover hay. At P.M. examination the rumens were full of the ingested grass and the smell of hydrocyanic acid was evident. Samples of the cut grass yielded 11 parts per thousand of hydrocyanic acid. In normal years cattle had grazed the paddock with impunity indicating that it was likely to occur only in exceptional circumstances in which there was stimulation to excessive ingestion.—D. C. BLOOD.

ANON. (1947.) A progress report on the investigations into etiology and control of enzootic (toxaemic) jaundice of sheep.—*Aust. vet. J.* 23. 38–42. 941

Information is provided on the geographical distribution and the effect of age, nutrition and breed on the incidence of the disease. A high copper status in affected sheep is constant. In some affected areas this is related to a high soil-copper level. In others the soil-copper level is normal and the high copper status of the sheep is apparently due to the presence of at least one "converter" plant, *Heliotropium europaeum*, an annual herb. This plant may also contain hepatotoxic substances other than copper.

Pasture improvement with clovers has no effect on the incidence. Grass dominance in pastures and an even, high plane of nutrition provide best protection. Iron sulphide reduces the copper status in the sheep but the use of iron sulphide in licks is not successful as a control measure because of the irregular consumption of the lick.—D. C. BLOOD.

of prolan were dissolved in 4 ml. of distilled water. 5 mg. of prolan contain 375 mouse units. The prepared solution was immediately injected subcutaneously into the side of the neck and was administered every 48 hours on the left and right sides alternately. One experimental bull received 1,875 m.u., the other 3,759 m.u. During both periods, preparatory and experimental, the potency, viability, quantity and quality of the semen of all the bulls were registered.

During the experimental period both control and experimental bulls showed improvement in the quality of semen. K. considers this to be due to good byre hygiene. No significant difference between control and experimental animals could be observed.

The injection of 1,875 or 3,850 m.u. of prolan did not result in an appreciable increase in the quality of semen and prolan had no influence on the sexual function of healthy bulls.—K. A. A.

HOPPE, F. G. (1945.) Infusionsterapien ved Kvaegets Omløbning. [Intra-uterine injection therapy for failure of conception in cows.]—*Maanedsskr. Dyrlæger.* 57. 99-102. 943

H. discusses the most suitable period for intra-uterine injection therapy in connexion with the insemination of cows. The results are given of the treatment of 132 cows with chronic catarrhal or chronic muco-purulent endometritis.

The infusion used was an aqueous solution of entozon 1-2 parts per thousand and of rivanol 0.1-1 parts per thousand, and in addition a 2-4 per thousand aqueous solution of iodine. About 250 ml. of this solution were used per treatment.

The cows were divided into two groups: (a) consisting of 51 cows inseminated from 5-21 days after treatment, and (b) of 81 cows inseminated later than three weeks after treatment. The best results were obtained in group (b), 67% became pregnant after the first insemination, 22% after two and 11% after three inseminations. In group (a) 37% became pregnant after the first insemination, 41% after the second and 22% after the third.

—M. E. ROBERTSON.

REYMANN, G. C. (1944.) Vergleichende therapeutische Versuche mit Tetanusantitoxin nach Injektion von Toxin oder Gartenerde. [Therapeutic investigation with tetanus antitoxin.]—*Acta path. microbiol. scand.* 21. 110-129. [In German.] 944

The therapeutic action of tetanus antitoxin was studied in infection experimentally produced by dry soil (so as to approximate that of tetanus infection under natural conditions). After low or medium doses of antitoxin there was a postponement of the symptoms of tetanus, but intoxication occurred, even after large doses of antitoxin, because of the persistence of a depot of infection in the injected soil. A comparison of the use of antitoxin in toxin- or soil-infection was made. It is considered that research on the infective agent and on the components of antitoxin would be more useful than an investigation of the toxin.

[The date "1818", referring to the work of Tulloch, on p. 128, line 23, of the original paper, should read "1918".]—J. R. SCOTT.

BARNUM, D. A. (1947.) Preliminary observations on the use of the penicillin bougie in the bovine udder.—*Canad. J. comp. Med.* 11. 64-67. 945

Penicillin bougies each containing 25,000 units, were used to treat 14 quarters carrying *Streptococcus agalactiae*. Each quarter received

one bougie at 12 hour intervals for two days. All quarters were sterile when examined ten days following treatment.

Penicillin levels in milk compared favourably with other methods of administration. Cell counts were normal and flakes or clots were not observed in the milk after treatment.—J. W. P.

WALKER, J. W. (1946.) Penicillin in peanut oil with 3 per cent beeswax; Local use in bovine staphylococcal mastitis.—*J. Amer. vet. med. Ass.* 108. 413-421. 946

Peanut oil with 3% beeswax was found to be a suitable vehicle, having the added advantage of increasing the stability of penicillin and reducing the diffusibility, thus prolonging the action, also, it was non-irritant.

Of two lactating cows each having three quarters infected with staphylococci, six successive injections were given in one quarter of each cow, at twelve-hour intervals of 50,000 units of sodium penicillin in peanut oil and beeswax; four injections under similar conditions were made into another quarter of each cow. The milk from all treated quarters was freed from the infection and the quarters were still negative after three months. The quarters infected, but not treated, remained infected and the negative quarter in each cow remained negative. In two dry cows each having two quarters infected with staphylococci treated with three doses of 50,000 units at twelve- or 24-hour intervals, there was no sign of irritation and the quarters were negative after treatment but all developed a similar staphylococcal infection later.

Field trials were carried out to find the effect of smaller and fewer doses. If 24 hours elapsed between treatments the cows were not milked at the intervening milking.

The results obtained were variable and less successful where induration of the udder was marked. They were, however, sufficient to show that penicillin is a most useful drug in treating mastitis caused by pathogenic staphylococci. No dosage is laid down but the opinion is expressed that a high level is probably essential.—C. D. W.

IRVIN, G. W., Jr., FONTAINE, T. D., & DOOLITTLE, S. P. (1946.) Partial antibiotic spectrum of tomatin, an antibiotic agent from the tomato plant.—*J. Bact.* 52. 601-607. 947

Tomatin is an antibiotic substance soluble in water and methanol and is extracted from the red currant tomato plant (*Lycopersicon pimpinellifolium*). Like penicillin, it inhibited *Staphylococcus aureus* and *Bacillus subtilis*, but was ineffective against *Bacterium coli*. Unlike penicillin it was highly effective against the Gram-negative *Phytoponas solanacearum*, a bacterial plant-wilt patho-

gen. Tomatin showed strong antibiotic activity against the Fungi Imperfeci group, the fungi used being strains of *Fusarium oxysporum*, plant-wilt pathogens, and the human dermatophytes *Candida albicans*, *Trichophyton mentagrophytes*, *Epidermophyton floccosum* and *Microsporum audouini*. These results suggest that tomatin may prove useful in the treatment of human and animal fungal infections if it proves to be of low toxicity and active *in vivo*.—N. SABA.

WEHR, E. E., & FARR, M. M. (1947.) Effect of sulfamethazine on the coccidian parasite, *Eimeria tenella* of chickens.—*Proc. helminth. Soc., Wash.* **14**. 1-12. **948**

Data are presented on the clinical and P.M. findings in *Eimeria tenella* infected chickens which had been fed 1% sulphamethazine in the mash for varying lengths of time or in capsules at various times during the course of the infection. The evidence indicated that the drug exerted both a coccidiostatic and coccidiocidal effect on *E. tenella*. Sulphamethazine fed in the mash for seven consecutive days from one to three days after inoculation materially benefited the chickens. Chickens first receiving treatment on the fourth to the sixth day after inoculation and for seven consecutive days derived little benefit from it. One per cent. medicated mash fed for six or seven days and beginning one day before inoculation delayed the appearance of clinical signs until the fourth day and the appearance of oocysts until the sixth day after the drug was withdrawn. Sulphamethazine, at the concentrations employed, was valueless when fed for 24 hours before and after inoculation. Infected chickens were greatly benefited when the drug was administered as a 1% concentration in the rations on the 45th to 72nd hours after inoculation. Necrotic lesions were found in the spleens of some of the chickens which received the 1% medicated ration for six and seven days. [These results, for the most part, conform to those obtained in this country.]

—C. HORTON SMITH.

OESTERLIN, M. (1941.) Sulfonamidverbindungen bei experimenteller Vogelmalaria. [Sulphonamides in experimental avian malaria.]—*Zbl. Bakter. I. (Orig.)* **147**. 339-342. **949**

The inactivity of sulphonamides against *Plasmodium praecox* in avian infections has been explained as due to the resistance of the parasite; and not to abnormal absorption of the orally-administered compound. In the course of investigations on experimental avian malaria, a basic dyestuff was prepared (a sulphonamide azo dye) the hydrochloride of which can be obtained as shining red crystals. It is a typical vital stain, but, like all sulphonamides, is inactive in avian

malaria. After oral administration of 20 mg. daily for 4-5 days small unorganized bodies appeared mainly in the erythrocytes. These bodies are of unknown origin and composition, and whether they are related or not to the parasite, or to the drug, or to both, is unknown. In fresh, unstained material they showed a pale red coloration. Their position was partly marginal, partly central; they varied in size, were isolated or often numerous in the corpuscle, but were without any pattern of regularity. They were demonstrable in the blood for from 6-8 days afterwards; during this time their position became more marginal. The conjecture that these bodies were connected with the malarial infection could not be substantiated. In canaries which had old, latent malarial infection, these small bodies appeared, and were also formed in healthy subjects although in smaller numbers. The bodies are not the result of deposition of dyestuff because they can be stained with Giemsa stain. Their precise nature has not been conclusively determined. If the dye is given to canaries which show the presence of parasites in peripheral blood, it is noticed that those within the vicinity of the pigment are stained. The impression is that the dye is deposited around the pigment as a red halo which diffuses into the plasma of the parasite. The chemical constitution of the dye leads to the assumption that it is stored similarly to plasmoquin. Intramuscular doses of 0.25 mgm. were sufficient to cause the disappearance of the parasites in 48-72 hours. If, however, the dye was given orally five hours beforehand, the activity of the plasmoquin was diminished and retarded.

—J. R. SCOTT.

\*MORIYAMA, H., & OHASHI, S. (1941.) The mode of action of sublimate upon phage protein.—*Arch. ges. Virusforsch.* **2**. 205. Abst. in *Bull. Inst. Pasteur.* **42**. 36. (1942.) **950**

The inactivation by sublimate of the *coli*-phage protein obtained by iso-electric precipitation is a monomolecular reaction similar to that of other inactivating agents like formol, tannic acid and anti-phage serum. The reaction secondarily tends to change into a bimolecular type. The inactivation brings about an intramolecular change of the protein similar to the denaturation by heat. The phage protein inactivated by sublimate retains all its antigenic properties. Sublimate is, therefore, suitable for the inactivation of phage without destroying its antigenic action.—E. K.

IYER, S. G., & HASHMI, Z. A. (1945.) A note on derris dressing of young chicks for the control of seed-ticks (Larvae of *Argas persicus*).—*Indian J. Vet. Sci.* **15**. 79. **951**

A 10% suspension of derris root powder in

water, for killing larvae of *Argus persicus* was found to be toxic for chicks below five weeks of age. The toxic effects were in proportion to the extent of body surface covered. Eleven birds two months old survived an application of the suspension over the whole body surface.—H. SINGH.

KINGSCOTE, A. A. (1946.) Further observations upon the tolerance of cattle to DDT.—*Canad. J. comp. Med.* **10**. 348-349. 952

Two grade cows fed a commercial 50% wettable D.D.T. powder, developed symptoms of poisoning following a minimum dose of 514 mg. per kg. actual D.D.T. and recovered from a maximum of 1,100 mg. per kg. Each cow received a total of 720 g. of wettable powder which is in excess of the quantity likely to be ingested following the spraying of barns.—P. J. G. P.

MARSDEN, S. J., & BIRD, H. R. (1947.) Effects of DDT on growing turkeys.—*Poult. Sci.* **26**. 3-6. 953

Turkeys 18 weeks old were fed a diet containing 0.3% D.D.T. By the end of 48 hours, in most of the birds there were moderate to violent tremors and considerable loss in weight. The affected birds lost the power of locomotion and died before the twelfth day. Experiments to determine the tolerance level in the diet showed that D.D.T. concentrations of 0.019% and 0.038% to be harmless but levels of 0.075% and over were definitely toxic.—N. SABA.

WU, C. C., GHOSH, S. M., MCCLYMONT, A. G., & ROY, D. N. (1946.) A preliminary report on some laboratory and field experiments to determine the relative effectiveness of pyrethrum, D.D.T. and gammexane D919 as insecticides and larvicides.—*J. Malar. Inst. India*. **6**. 285-295. 954

Powdered gammexane was more toxic for cockroaches than pyrethrum or D.D.T. With flies and culicine and anopheline mosquitoes, pyrethrum was distinguished by its quick knock-down effect, while the proportion killed after 24 hours was very high. With D.D.T. the kill rate after 24 hours was lower than with pyrethrum; with gammexane the kill-rate was slightly higher than with D.D.T. Gammexane powder was the most satisfactory for controlling fly breeding and for killing bed-bugs. The residual effects of D.D.T. and gammexane lasted much longer than with pyrethrum. While the three insecticides readily act on adult lice, kerosene mixtures of D.D.T. and gammexane have no action on the eggs.—F. C. MINETT.

RUDE, C. S. (1947.) DDT to control the Gulf Coast Tick.—*J. econ. Ent.* **40**. 301-303. 955

The tick *Amblyomma maculatum* attacks live-stock in the region bordering the Gulf of Mexico,

The immature stages are found on birds and small mammals, whereas the adults attack cattle, horses, sheep, goats, dogs, deer and man. They attach themselves to the outer ear, base of the horn, eyelids, mane or forelock, causing swellings and the exudation of a yellowish serum which hardens into a scab, predisposing the animals to attack from screw-worm fly, *Cochliomyia americana*. Ticks are active from July to October and there is a certain amount of evidence to show that systematic mowing of pastures helps to control the tick.

Various D.D.T. preparations were tried on livestock and an effective mixture containing resin 47%, dibutyl phthalate 15%, methyl abietate 33% and D.D.T. 5%, known as Stock 1087 was developed. With cattle Stock 1087 gave a good initial kill of ticks and provided 3-6 weeks protection from serious re-infestation. Only 33 cases of screw-worm, as a result of tick injury, occurred in 3,280 cattle, whereas in 25 control animals there were nine cases. Seventy-three sheep, bearing an average of eight ticks per ear, yielded only a total of nine ticks four weeks after treatment. Stock 1087 should be applied to the ears of the animals as soon as the ticks become numerous. A second application should be made when the ticks again begin to attach themselves.—BERYL A. THURSTON.

DAVIS, D. E. (1947.) The use of DDT to control murine typhus fever in San Antonio, Texas. *Publ. Hlth Rep., Wash.* **62**. 449-463. [Author's summary amended.] 956

To determine the value of reducing rat fleas for the control of typhus fever, an experiment was conducted in San Antonio. The south-western part of the city was dusted with DDT and the rest of the city was untreated.

A crew of 10 men in house to house inspections placed 10-percent DDT in every place rats frequented. A total of 26,832 premises were inspected between April 4 and August 31, 1945. Forty-eight premises were worked per man-day, with an average  $\frac{1}{4}$  lb. of DDT and an operational cost of 25 cents per each of the premises.

Rats were trapped and combed before and after the application of DDT. At first, due to the inexperience of the dusting crew, the drop in flea index was small, but in June and July reductions in flea abundance occurred. The blood from rats caught in the same area in May (before DDT) and in September (after DDT) was tested for complement-fixing antibodies; the prevalence of antibodies in young rats decreased.

The incidence of human infection diminished during the year following these operations.

VANDERPLANK, F. L. (1947.) Experiments with DDT on various species of tsetse flies in the field and laboratory.—*Trans. R. Soc. trop. Med. Hyg.* **40**. 603-620. 957

The use of D.D.T. for tsetse destruction is discussed. It is claimed that dusting from the air is too expensive, as at least three aerial dustings would be required. The spraying of tsetse traps with D.D.T. was also rejected on the score of expense. As cattle are the favoured host of most tsetse species it was thought that if an area was flooded with cattle, game would tend to leave the area and the cattle could be sprayed with a solution or suspension of D.D.T. lethal to tsetse as a residual film. Female tsetse require at least five meals before producing the first larva, and therefore would be poisoned before they were able to reproduce.

Detailed experiments are recorded on the lethality of D.D.T. to many species of tsetse by proboscis contact and by foot contact, and on the factors governing the value of D.D.T. dressings and their persistence on cattle. If solutions of D.D.T. in volatile solvents were used, the solvent quickly evaporated leaving needle-like crystals of D.D.T. If such solutions were emulsified, the size of the residual crystals depended on the size of the particles of the disperse phase of the emulsion and the strength of the D.D.T. dissolved in it. When the disperse phase particles were between 1 and  $7\mu$  in diameter, a 5% solution in kerosene gave long needle-like crystals, and a 0.25% solution gave short rectangular crystals. It was more advantageous to have numerous small residual crystals over the surface than a few long crystals. On dried ox hide, 0.25 g. per square metre applied as a 0.25% solution of D.D.T. in kerosene, emulsified with equal parts of gum solution or other adhesive, was as effective as 5 g. per square metre applied as a 5% solution in kerosene emulsified with gum solution, and more effective than diluting the 5% emulsion so that 0.25 g. was distributed over a square metre. In the laboratory, the residual effect lasted from 6-12 weeks, the higher the percentage of D.D.T. the longer the effect lasted. Although D.D.T. had no immediate toxic effect on the mammals used, prolonged application might cause chronic poisoning.

The field experimental work was carried out by the use of two groups of cattle and natives carrying screens, one group of oxen and screens being treated with D.D.T. emulsion. Flies caught on each group were marked, the numbers of marked flies caught on following days giving an indication of the survival rates amongst settling flies. On screens used in the field it was found that the crystals of D.D.T. had fallen off by the third day, but better adhesion was obtained by using ox serum, to which 0.5% sodium arsenite was added, as the emulsifying solution.

Tables show the numbers of flies recaptured

after marking on the two groups, indicating a high percentage of destruction on the treated group for the first six days, with some persisting effect for three weeks after treating with the ox-serum emulsion. On wet days the killing rate was reduced, a film of moisture appearing to provide some insulation between the fly and the poison.

—U. F. RICHARDSON.

SEGHELLI, L., & MARSH, H. (1947.) Experimental treatment of trichostrongylosis in sheep with phenothiazine.—*Amer. J. vet. Res.* 8. 186-191.

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In Montana the percentage of infestation by trichostrongyles in sheep was greater than that by any other genus; enabling a comprehensive study of phenothiazine therapy to be organized. Clinical trichostrongylosis appeared in a flock of over 100 ram lambs on irrigated pasture. The effect was compared of transferring the lambs to pens and putting them on dry feed.

Each lamb of half of the flock received a single dose of 37.5 g. of phenothiazine. The faecal trichostrongyloid egg count fell from a pre-treatment average of 1,760 to a 100 per g. of faeces or less during a period of 18-90 days after treatment. In the control groups the initial count of 1,870 was reduced to 419 after two weeks on dry feed, fell further later, but rose again to 600 at the 90th day. Weight gains criteria were also markedly in favour of phenothiazine therapy, with an average advantage of 15 lb. per lamb in the test group.

The main conclusion is that phenothiazine in high dosage is effective as an adult ovum killer, as well as an egg production inhibitor of *Trichostrongyles*, and that its use is of definite value.—J. E.

MAWSON, R. (1946.) Treatment of osteoarthritis by lactic acid injection. A series of 26 consecutive cases in general practice.—*Brit. med. J.* Nov. 9th. 691-693.

959

An account is given of 26 cases of various types of arthritis in the human subject treated by intra-articular lactic acid injections according to the method described by WAUGH (1936). All except two of the cases showed marked improvement. One of these refused to have more than a single injection and the other, with acute rheumatoid arthritis of the wrists, showed no improvement. The amount of lactic acid injected was usually 15-20 ml. of a 0.2% solution with procaine at a pH of 5.2. Injection was made into or around the infected joint and repeated after seven days. Subsequent injections, up to six, were given if required.—D. D. OGILVIE.

WILLMAN, J. P., LOOSLI, J. K., ASDELL, S. A., MORRISON, F. B., & OLAFSON, P. (1946.) Vitamin E prevents and cures the "stiff-lamb disease".—*Cornell Vet.* 36. 200-204.

960

Seventeen stiff lambs received treatment with vitamin E and no death occurred. Of eight other stiff lambs which received no treatment three died and two had to be destroyed. From the results of experiments extending over two years, vitamin E appears to be of value as a cure for stiff lamb disease.—E. M. CRUICKSHANK.

ATKINS, P., & WARD, J. L. (1945.) The antibacterial effects of analogues of vitamin K.—*Brit. J. exp. Path.* 26. 120-124. 961

The antibacterial activity of certain vitamin K analogues have been studied. Gram-negative bacteria were less susceptible than Gram-positive organisms. The antibacterial activity was dependent on available free naphthoquinone. The stable acetic and phosphoric acid esters of 2-methyl-naphthohydroquinone had a relatively low activity and it was after enzymatic dephosphorylation that the diphosphate had full activity similar to that of the naphthoquinone and to the readily hydrolysed disuccinate of 2-methyl-1 : 4-naphthohydroquinone.—E. KODICEK.

BAUMANN, R., & KMENT, A. (1944.) Skorbut-Prophylaxe durch Ascorbinsäure in den Meerschweinchenzuchten. [Ascorbic acid for the prevention of scurvy in g. pig breeding.]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* January 7th. 5-7. 962

Because of the difficulty of maintaining an adequate supply of green food as a source of vitamin C for g. pigs during the winter and early spring, tests were made of the anti-scorbutic value of ascorbic acid injected subcutaneously. The dose administered was 3-4 ml. per g. pig of a 10% solution of ascorbic acid in physiological saline, neutralized with NaOH. The animals which received green food in addition to five injections remained healthy and weight increase was well maintained for over three months.

—E. M. CRUICKSHANK.

I. COWIE, A. T., & FOLLEY, S. J. (1947.) Adrenalectomy and replacement therapy in lactating rats. 2. Effects of deoxycorticosterone acetate on lactation in adrenalectomized rats.—*J. Endocrinol.* 5. 14-23. [For part I, see *V. B.* 15. 204.] 963

II. COWIE, A. T., & FOLLEY, S. J. (1947.) Adrenalectomy and replacement therapy in lactating rats. 3. Effects of deoxycorticosterone acetate and 11-oxygenated cortical steroids on lactation in adrenalectomized rats maintained on stock or high-protein diets.—*J. Endocrinol.* 5. 24-31. 964

I. Adrenalectomy on the fourth day of lactation caused a marked but usually only partial, inhibition of lactation in rats. The partial nature of the inhibition was not due to accessory adrenal

cortex tissue. Lactation was maintained, in most cases partially, by daily administration of desoxycortone acetate. There was a graded relation between dose and response.

II. Rats receiving a high protein diet (about 50% protein) lactated less efficiently than rats on a stock diet (about 20% protein). Adrenalectomized rats lactated equally well on either diet, but at a much reduced level. Desoxycortone acetate was more effective than 11-desoxycorticosterone, or an adrenal cortex extract, in maintaining lactation in adrenalectomized rats on a stock diet. The lactational response of adrenalectomized rats to desoxycortone acetate was almost as great on the high protein as on the stock diet, but the response to 11-oxygenated cortical steroids and adrenal cortex extract was very much reduced by the high protein diet. It is concluded that the primary cause of the lactational inhibition which follows adrenalectomy cannot be due to the loss of those adrenal cortex hormones (11-oxygenated steroids) which are closely concerned in protein and carbohydrate metabolism.—J. M. ROBSON.

KLIMMER, R. (1948.) Nebennierenrindeninsuffizienz. [Insufficiency of Adrenal Cortex Hormone.]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 51/49. 146-148. 965

This is an account of a case of suspected adrenal insufficiency in a cat and the successful desoxycorticosterone acetate therapy.—A. T. C.

RIKER, W. F. (1946.) The treatment of experimental arsenic poisoning with the dithiols.—*J. Pharmacol.* 87. No. 4. Suppl. pp. 66-71. 966

Cats were poisoned with arsenic by the intravenous injection of mapharsen (phenol arsenoxide HCl) in a dose of 8 mg. per kg., which was slightly in excess of the LD 100 dose for cats.

A dithiol antidote was administered intramuscularly within a few minutes of the arsenic injection, two dithiols being studied, 2, 3-dimercaptopropanol (BAL) and its ethyl ether, 2, 3-dimercaptopropyl ethyl ether.

With a single intramuscular injection of 2% BAL in cotton seed oil, complete protection was afforded by the minimal dose of 0.02 m.M. per kg.

With higher doses of BAL there was longer survival time of the treated animals but the repetition of a relatively large dose served to increase rather than decrease the mortality. Solutions of BAL in saline were much less efficacious than solutions in oil. With the ethyl ether of BAL, the dose required for protection was five to seven times that of BAL on a molecular basis, but the signs of poisoning were significantly less. The ethyl ether of BAL was found to protect cats against the lethal action of arsine gas, and effectively diminished the associated haemolytic effects.—H. P.

WERNER, H. (1945.) Further observations of the clinical value of a growth-promoting substance in wound treatment.—*Brit. J. Surg.* 32. 518-522. 967

Heart extract powder (H.E.P.) successfully promoted healing a diverse series of wounds in man, which had failed to respond to orthodox treatment over a period of several weeks. The cases belonged to three groups:—chronic ulcers; wounds from projectiles, especially those having

See also absts. 859 (tetanus); 872 (trichloride of arsenic and trypanosomiasis).

### PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

WEADON, M. (1947.) A discussion of new developments in glaucoma.—*J. Amer. vet. med. Ass.* 110. 375-376. Discussion p. 376. 968

An operation is described for the relief of glaucoma in the dog by removal of the lens. It is held that the extent to which the sight is regained is directly proportional to the age of the dog.

—J. DEANS RANKIN.

HECHTER, O. (1947.) Studies on spreading factors. I. The importance of mechanical factors in hyaluronidase action in skin.—*J. exp. Med.* 85. 77-97. [Author's summary copied verbatim.] 969

The spreading response induced by intradermal administration of hyaluronidase is influenced not only by enzyme concentration, but also by the volume and pressure of the injection. These pressure-volume factors influence the rate of spreading and determine the final area of spreading. When a constant volume is injected, the rate of spreading to the area determined by the volume of injection is a function of the enzyme concentration. These and other findings have led to the conclusion that hyaluronidase is an effective spreading agent only when the slow diffusion of enzyme in skin is accelerated by a localized increase of interstitial pressure and volume. These considerations of hyaluronidase action in skin have been utilised to explain the shape of the dosage-response curve of hyaluronidase spreading activity, and the differences in the spreading reactions between crude snake venoms and purified hyaluronidase. The significance of the findings as related to the rôle of hyaluronidase in bacterial invasiveness, and in the assay of S.F. are briefly discussed.

KLING, K. G. (1944.) Beitrag zur Kenntnis der Entstehung der mehrkernigen Fremdkörperzellen. [Concerning the origin of the multinucleate foreign body giant cell.]—*Acta path. microbiol. scand. Suppl.* No. 54. pp. 327-345. [In German.] 970

HAYTHORN (1929) specified eight types of multinucleate giant cells. It is assumed that they

a "breakdown tendency" due to tension from tendons and adhesions to muscles; and burns. The majority healed rapidly in about 1-3 weeks following the use of H.E.P. despite the fact that no improvement had previously resulted from intensive treatment with penicillin, sulphanilamide and skin grafts, etc. H.E.P. was shown to have a systemic effect in that the treatment of one of a number of isolated ulcers in a patient, promoted the healing of the others.—J. KEPPIE.

result from either amitotic division of the nucleus of an original cell without subsequent divisions of the cytoplasm, or from the fusion of several complete cells, or, alternatively, that what appear to be giant multinucleate cells are in reality phagocytes that have ingested a cell or cells which have then divided. K. studied the last possibility.

Giant cells were induced in mice by the intraperitoneal injection of lycopodium spores or Kieselguhr and the resultant granulomata examined microscopically. Some of the mice were subjected further to the action of colchicine, injected eight hours before they were killed.

In the animals given kieselguhr what are described as multinucleate mother cells of foreign body giant cells could be recognized up to the 16th day, the nuclei undergoing mitosis or having completed mitosis; there was evidence that the mitosis could occur more than once without losing appearance of cell partition.

The results in the lycopodium series were more difficult to interpret, as the spores are too large for easy cellular ingestion. It could not be seen clearly whether the cell material all round the spore was a single cell. Giant cells with mitotic nuclei however were clearly visible.

The results were not conclusive, but it is suggested that whether or not cell partition follows nuclear division may be influenced by osmotic conditions.—J. E.

ARTHUR, G. H. (1946.) Some observations on the blood leucocyte picture in bovines during reaction to the intradermal tuberculin test.—*Vet. J.* 102. 147-157. 971

The author made observations on ten heifers, all reactors to the intradermal tuberculin test, and as controls used five non-reacting females from a Grade A herd. Details are given of the total and differential leucocyte counts, and of skin measurements at different intervals after the injection of tuberculin. In the control group there was no significant change in the total or differential leucocyte counts.

In the reactors the total leucocyte counts

averaged 6,580 per c.mm. at the time of first injection, 9,680 after 12 hours, 8,200 after 30 hours and 8,880 after 60 hours. For the other counts at these times the figures were:—neutrophiles, 21.8%, 48%, 26%, 38.2%, including the non-segmented type for which the figures were 1.5%, 4.7%, 1.9% and 6%; lymphocytes, 64.8%, 48.8%, 63.3%, 46.3%. The lymphocyte-neutrophile ratio changed from approximately 2 to 1 to 1 to 1.

The author states that there is a definite association between blood leucocytic changes and capacity to react to the intradermal tuberculin test, but that it is not clear as yet whether it is an expression of tuberculin allergy or only related to tuberculous infection.—W. R. KERR.

MATRONE, G., PETERSON, W. J., BAXLEY, H. M., & GRINNELL, C. D. (1947.) Copper and iron in the blood serum of dairy cows.—*J. Dairy Sci.* 30. 121-126. **972**

Values for serum iron and copper, cell volume and haemoglobin were estimated in 16 cattle divided into four age groups of 4-6 months, 12-18 months, 2-2½ years and 4-7 years, each group containing one animal from each of the following breeds: Ayrshire, Holstein, Guernsey and Jersey. Blood was taken at four periods from January to March during which the animals were barn fed except for the last bleeding in March when they were at pasture.

The mean values obtained were serum iron 162 µg. per 100 ml. (range 130-184 µg.), serum copper 100 µg. per 100 ml. (range 88-116 µg.), haemoglobin 9.9 g. per 100 ml. (range 9.4-10.1 g.) and cell volume 32% of total volume (range 30.9-32.9%).

There was no significant difference due to breed or indication that serum iron values changed with age, but it is claimed from the very limited data that serum Cu and Hb values increased with advancing age, Cu ranging from about 90 µg. per 100 ml. in calves to 114 µg. in 4-7-year-old cows and Hb increasing from 9.1 to 10.6 g. per 100 ml. in the same age groups.—R. ALLCROFT.

FREI, W. (1945.) Die Rolle der Gefässwand bei der Infektionsabwehr. [The role of the vascular wall in defence against disease.]—*Schweiz. Arch. Tierheilk.* 87. 341-357. **973**

F. discussed various vascular changes occurring in response to bacterial infection, and dealt mainly with the contractility and permeability of vascular walls, the phagocytic activity of endothelial and adventitial cells, the production of antibodies, and allergic inflammatory phenomena.—E. COTCHIN.

FURUTA, W. J. (1947.) An experimental study of lymph node regeneration in rabbits.—*Amer.*

*J. Anat.* 80. 437-483. [Author's summary copied verbatim.] **974**

In this experimental study on lymph node regeneration the popliteal node was removed surgically in 152 rabbits, ranging in age from 3 days to 3½ years. Unilateral and bilateral excisions gave a total of 270 specimens which furnished the basis for observations.

Neoformation of lymph nodes took place at the site of excision but this neoformation was dependent on the age of the animal. Although it occurred in about 50% of young and near-adult animals, the optimum age range both as to incidence and to quality of structural differentiation was approximately at 45-60 days.

The inclusion of specimens which contained only unorganized lympho-reticular islands shows that the potentiality for regeneration remains at a much higher level (approximately 80-90%) in the young and near-adult animals.

Reformation of lymph nodes in adult animals (8-15 months) was negligible. Its resurgence, however, in senile rabbits (2 to 3½ years) was inconclusive because of the limited number of specimens available for study.

The sequence of events in reformation generally simulate the normal morphogenesis of the original lymph node. The anlage begins as a small island of mesenchymal cells (lymphoreticular tissue) in the vicinity of the reestablished lymphatics, and differentiates into a lymphatic nodule. The conversion of the latter into a true node requires about 3 to 4 weeks. The completed nodes of regeneration possess a lymphatic by-pass or shunt, a feature which was found to be specific for them.

KENNETH, J. H. (1947.) Gestation periods: A coincidence.—*Vet. Rec.* 59. 101. **975**

The author records the curious fact that the average gestation period of many domestic and laboratory animals can be expressed as approximate multiples of 3.1416 (or  $\pi$ ) days. This periodicity or temporal coincidence is further exemplified in the oestral cycle of the mouse and the hamadryad baboon and also in the human menstrual period. The ratio is, as stated, approximate. Thus, with the dog the ratio is 20.05 and for the cat, 17.8.—F. R. BELL.

VARIČAK, T. (1946.) O naročitim tvorevinama na paraplacentarnom području plodnog mjeđura psa. [Peculiar structures in the non-villous region of the foetal membranes in the bitch.]—*Vet. Arhiv.* 16. 1-7. [Abst. from German summary.] **976**

On P.M. examination of four pregnant bitches peculiar thickenings were seen on the non-villous portion of the foetal membranes. These were

white in colour, generally oval in shape and of varying sizes and situated along the course of the blood vessels. Their histology is described. The author did not form any opinion as to their nature.

—K. J. SINCLAIR.

PEETERS, VANDEPLASSCHE & MASSART. (1946.) **Hormonal treatment of agalactia in the mare.**

—*Vet. Rec.* 58. 627. 977

Absent or scanty milk flow in the mare after parturition is most often due to insufficient development of the mammary gland during the last weeks of gestation, and generally recurs year after year. 2-3 g. of an ointment containing 1% di-ethylstilboestrol were smeared every day from 4-14 days before the expected date of parturition on the udders of six pregnant mares, which had given little or no milk at the end of the previous gestation. In all the mares there was complete udder development and the milk yield was good; parturition was in all cases somewhat delayed. Application of the ointment after parturition to the udder of two mares developing this type of agalactia was without effect.—E. COTCHIN.

TURNER, C. W., & REINEKE, E. P. (1946.) **The relation of the route of administration of thyroxine, thyroprotein, and intermediate products upon their utilization by ruminants.**—*Res. Bull. Mo. agric. exp. Sta.* No. 397. pp. 20. 978

See also abst. 1032 (textbook of chemistry).

#### PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

GROULX, A. (1946.) **Pasteurization in the Province of Quebec. With special reference to Montreal.**—*Canad. J. publ. Hlth.* 37. 17-21. 979

The statistics given from the year 1890 up to the present show the gradual introduction of milk pasteurization in the province of Quebec. Although pasteurization is not compulsory the province has 188 pasteurization plants in operation. In the whole province over 300,000 gallons of milk are consumed daily, of which more than 50% is pasteurized.

The results of pasteurization in the City of Montreal with reference to disease are given. The mortality due to milk-borne disease has greatly declined. Typhoid fever and paratyphoid fevers no longer constitute a problem. There has also been a decrease in brucellosis. The infant mortality has declined from 183 per 1,000 live births for the five-year period 1915-1919 to 69.1 in 1944. This decline is thought to be due chiefly to the adoption of pasteurization.

It is pointed out that the pasteurization of milk should be generalized. Raw milk and its products still remain the source of many infections.

—J. W. PULLIN.

Experiments were carried out to determine the relation of the route of administration of thyroprotein to its utilization by ruminants. Subcutaneous injection of thyroprotein was found to be 20 times as effective as the oral administration in capsular form. Suspensions of thyroprotein had lower biological activity than the dry form. Administration of copper sulphate just prior to thyroprotein drench did not improve the results. This suggests that the rumen is not responsible for loss in biological activity. Coating of thyroprotein with stearic acid, paraffin, beeswax or plastic materials did not improve its biological activity on oral administration. Administration of thyroprotein direct into the abomasum through a fistula did not materially alter its activity. This result supports the observations of the first two experiments.

Data from administration of chemically hydrolysed thyroprotein indicate that there is improved oral absorption—but this is counter balanced by some destruction of the active principle.

Comparison of the ratios of oral: subcutaneous administration of thyroxine and thyroprotein suggests that part of the decrease in biological activity is due to incomplete digestion.

—N. SABA.

BUCHBINDER, L., & ALFF, E. C. (1947.) **Studies on coliform organisms in dairy products. The practical significance of so-called heat resistant coliform organisms in the coliform testing of pasteurized milk.**—*J. Milk Food Technol.* 10. 137-148. [Authors' conclusions copied verbatim.] 980

Evidence was obtained as the result of a pasteurizing plant investigation and laboratory studies that so-called heat resistant coliform organisms are of absolutely no practical significance in the coliform test of pasteurized milk.

ALLENSPACH, V. (1947.) **Kleine Verbesserungen für Schlachtanlagen. [Minor improvements of abattoirs.]**—*Schweiz. Arch. Tierheilk.* 89. 175-185. 981

The smaller technical improvements which have been introduced in recent years into abattoirs are discussed.

In the middle of a fenced court a strong gate is anchored on a moveable base so that it can be moved to all parts of the fence, for rapid collection of the animals in the court. To keep the heads of the slaughtered cattle in a convenient position for oral and pharyngeal cavity inspection, special plated holders are fixed to the pillars and the walls of the

abattoir at the appropriate height. In order to place the pancreas, other viscera and head and feet separately, fixed basins of stainless steel with inner partitions were built which allow proper and convenient inspection and storage. Brushes and other small utensils are kept on simple holders fixed on the walls with small basins at the bottom. For quick and thorough cleansing of thoracic viscera and the diaphragm which are always soiled by blood, large fixed double-walled pails are in use. Attached to water-supply, the dirty water runs off automatically over the edge of the innermost wall of the pail. A spherical hermetically closing trailer of a stainless alloy with rounded edges and corners for easy cleaning has been built for the removal of pigs' hair and similar refuse and is emptied by a tilting mechanism.

Blood is used for human food production only during the winter months; otherwise it is collected for industrial use in large containers built-in under the floor of the abattoir. After collecting for two to four days the blood is evacuated into a 500-gallon trailer after a vacuum has been created in the trailer by a compressor. The same compressor later pumps the blood from the tank of the trailer to the drying plant.—C. A.

BRANDT, O., & HÜLPHERS, G. (1942.) Försök att genom en avbränning oskadliggöra på ytan av bröst- och bukväggarna efter revning förekommande tuberkelbaciller. [Attempt to kill tubercle bacilli in carcasses affected with tuberculosis of the pleura and peritoneum, by flaming the tissues exposed by stripping off the serous membranes.]—*Svensk VetTidskr.* 375-381. [English summary.] Reprinted in *Medd. Veterinärhösk. Stockh.* No. 16. (1942.) 982

The problem was investigated whether the thoracic and abdominal wall musculature from cattle having pleural or peritoneal tuberculous lesions, does or does not contain living tubercle bacilli, after the serous membrane carrying the lesions has been stripped. The destruction of live tubercle bacilli by blowlamp flaming of the stripped musculature was tested.

Experiments were carried out on 17 cases of pleural and four cases of peritoneal TB. In nine of the former and two of the latter it was possible to recover live tubercle bacilli from the musculature both before and after flaming, so it is considered that this procedure is ineffective in rendering the musculature of cattle with pleural or peritoneal TB. safe for human consumption after removal of the serosa [see also *V. B.* 10. 246].—J. E.

BURROW, H. (1947.) The Benjamin Ward Richardson lecture. The future control of

abattoirs and knackeryards.—*J. R. Sanit. Inst.* 67. 95-99. Discussion 99-101. 983

At present, some 600 abattoirs, under the control of the Ministry of Food, are supplying the whole country, and all private abattoirs are idle. Such public abattoirs should cater for both the wholesaler employing specialized slaughtermen, and the small trader doing his own slaughtering. Administration in the past has been by Local Authority and this is recommended for the future as being more efficient than a central Government control. Few abattoirs are large enough to warrant the appointment of a whole-time veterinary surgeon, but inspection before and after slaughter is clearly a veterinary duty. The Sanitary Inspector should confine himself to detecting uncleanness and abnormality. The Medical Officer is solely concerned with the health of the staff. Each, the Veterinary Surgeon, Sanitary Inspector and Medical Officer should be directly under the Local Authority.

Knacker-yards, although subject to licence by the Local Authority, are usually neglected by them. Properly run, they could be of invaluable assistance in recording the incidence of disease amongst animals and in its eradication. At present they tend to spread disease.

—R. MACGREGOR.

DRAPER, W. F. (1947.) Public health administration.—*J. Amer. vet. med. Ass.* 110. 219-223. 984

The U.S.A. Public Health Service is composed of four main divisions:—The National Institute of Health which co-ordinates scientific research and issues annually millions of doses of vaccines and conducts research; recent examples of such research are:—on infantile paralysis, mumps, and common colds, and the influence of fluorine in drinking water on tooth decay. The Bureau of Medical Services provides services for prisons, quarantine stations, U.S.A. Mercantile Marine and coastguards. The Office of the Surgeon General (P.H.S.) administers and assigns staff, collects statistics and attends to International Health Relations and to finance. The Bureau of State Services co-ordinates and unifies state and local authorities laws, and provides them with grants in aid, expert advice, demonstrations of new techniques and trained employees. Ten sub-offices also supply visiting officers who act as "missionaries" to backward areas.

—R. MACGREGOR.

ANON. (1946.) Verrechnungsstelle (V.S.) (1) Falkensee, Hamannstrasse 11. [Fee collecting and information centre Berlin-Falkensee.]—*Berl. Münch. tierärztl. Wschr.* July. No. 1. pp. 10-11. 985

Fee-collecting and Information Centres (Verrechnungsstellen) were set up in 1936 by the German Veterinary Council for the convenience of veterinarians. Following the dissolution of the Veterinary Council, these centres have been thrown on their own resources and the Berlin-Falkensee centre has undertaken the liquidation of the affairs of the Council in the Russian zone of Germany. Finances are precarious since all credits have been "frozen"; the position regarding insurances taken out through the centre by its members is also still undecided. The membership totalled 348 veterinarians, their present addresses are invited.—E. V. L.

ANON. (1946.) Vom früheren Reichsgesundheit-

samt. [The former German Department of Health.]—*Berl. Münch. tierärztl. Wschr.* August p. 24. 986

Following the capitulation, the former German Department of Health has been re-named the "Institute for General Hygiene". Its address is Berlin-Dahlem, Unter den Eichen 82-84, and it is divided into four departments: - human medicine; veterinary medicine; chemistry, pharmacy and nutritional physiology; hygiene and health.

The department of veterinary medicine is at present producing and supplying a limited number of vaccines, biologic diagnostic agents, cultures and sera.—E. V. L.

## LIVESTOCK HYGIENE

STRIEBER, W. R. (1947.) UNRRA veterinarian's duties.—*Vet. Student, Iowa.* 9. 152-153. 987

A very brief account is given of the duties of a veterinary officer during transport of horses by sea from America to Europe and of the diseases commonly encountered during such voyages.

—M. C.

NEEDHAM, N. V. (1947.) A photometric method for the comparative evaluation of disinfectants.—*J. Hyg., Camb.* 45. 1-11. [Author's summary copied verbatim.] 988

Attention is called to the widespread dissatisfaction with the standard of reproducibility attained with the existing disinfectant tests. It is suggested that this lack of reproducibility is inherent in any 100% mortality test. The trend in all recent disinfectant developments appears to be towards greater specificity than was the case with the older products. Where a comparison is being made to ascertain the true relative efficiency of two or more disinfectants, this possible specificity necessitates their examination under a wider range of conditions than has been catered for in the past. A technique is suggested for use in those cases where a more limited examination will provide all the information that is required. It employs a simple culture medium, uses a measured quantity for the transfer from the medication tube, and makes use of a compensated photo-electric circuit to determine the amount of growth produced by the organisms which have survived the contact with the disinfectant.

ROBERTSON, O. H., PUCK, T. T., & WISE, H. (1946.) The construction and operation of experimental rooms for the study of air-borne infection.—*J. exp. Med.* 84. 559-567. 989

A detailed description of the construction of a room for the study of airborne infection is given. The room in which the tests are actually

carried out is built inside an air conditioned room, and its temperature and humidity can be kept constant to within limits of 1°F. and 2% relative humidity respectively. Bacteria are sprayed into the room by means of an atomizer operated by compressed air, and air sampling is carried out either by the use of settling plates or bubbler samplers, the relative merits of which are discussed. Glycol vapour concentration is controlled by means of a glycostat. It was found necessary to wash the entire surface of the room with water following the use of glycol.—G. B. S. HEATH.

— (1947.) Discussion: Modern methods in the control of airborne infections. [Abridged.]

Speakers: CRUICKSHANK, R., WRIGHT, J., HARWOOD, F. C., LIDWELL, O. M., MITMAN, M., CUNLIFFE, A. C., BURN, J. L., ALSTON, J. M., GUNN, W., & HARE, R.]—*Proc. R. Soc. Med.* 40. 381-388. 990

Airborne infection is "infection by inhalation"; spread of infection by direct droplets is contact. Airborne infection occurs among human beings in respiratory infections and many specific fevers. The spread of acute respiratory disease cannot be attributed entirely to airborne infection; endogenous infection and contact are important. In community foci of infection the risk of infection can be estimated by bacteriological sampling, using *Streptococcus viridans* as an index of pollution; and detection of tracer substances volatilized in air allows measurements of ventilation rates. The relative importance in the spread of infection by droplets, dust, and droplet nuclei is set out. Nasal carriers of haemolytic streptococci are the most important contributors to infection of the environment. Spread by dust may be more important in bacterial than in virus infection. Control has been achieved by ultra-violet light in measles and respiratory infections in infants,

although American investigators concluded that ultra-violet light and triethyleneglycol aerosols failed to produce any "dramatic" reduction in upper respiratory tract infections.

To suppress dust in wards, the use of oiled floors and fabrics is advocated as the only practicable method.

Laboratory tests of  $\alpha$ -hydroxycarboxylic acids were reported. The reduction of contamination of air in a room depended on the pre-existing rate of removal of bacteria-carrying particles by ventilation and sedimentation. Factors affecting the killing rate of  $\alpha$ -hydroxycarboxylic acids are: (i) increase in its concentration—little killing at low, with rapid increase, and finally a relatively constant maximum; (ii) relative humidity—maximum killing between 60% and 80%, with a rapid fall in killing rate below 50% R.H.; (iii) increase in particle size—killing rate diminished; (iv) nature of the particles—with dry dust, killing rate low, with natural sprayed salivary flora, intermediate, and with sprayed cultures, high. Different species of organisms varied in sensitivity. It was thought that intermittent aerial disinfection at the time of activities known to cause peak infection would prevent spread of infection. Prevention of a very infectious virus disease (influenza) might be more difficult than prevention of a bacterial infection.

—J. R. SCOTT.

ANON. (1947.) The present status of the control of air-borne infections.—*Amer. J. publ. Hlth.* 37. 13-22. [Conclusions copied *verbatim*.] 991

The subcommittee offers the following five points to summarize its group judgment concerning the present status of the application of engineering methods to control air-borne infection:

The oiling of floors, blankets, and bedding has now developed to the point of practical application in the suppression of dust. Such measures constitute good housekeeping. They reduce bacterial contamination of the air, but there is as yet insufficient evidence that they prevent disease. Dust suppression should be applied wherever practicable in conjunction with ventilation, ultra-violet irradiation, and disinfectant vapors, when the latter methods are employed.

The available evidence strongly indicates that methods of air disinfection (ventilation, ultra-violet irradiation, and glycol vapors) are useful adjuvants to aseptic techniques in the reduction or elimination of air-borne infections in operating rooms and in contagious disease and pediatric wards. Installations are indicated under conditions where there has been demonstrated or there exists potentially a significant incidence of cross-infection or a serious risk to patients. It is essential that competent engineering supervision be available to insure the adequacy of the original installation, to

maintain its continued effectiveness, and to protect both personnel and patients.

It is not yet possible to compare the relative efficiency of ultra-violet irradiation and glycol vapors. Only the former method has been developed to a point of practical application. Recent designs of glycol vaporizers and automatic control devices give promise that adequately controlled studies may be conducted in the near future. The relative merits of the two procedures will involve such problems as cost, safety, and the consistency of effective operation based upon long experience.

The general use of ultra-violet irradiation or disinfectant vapors in schools, barracks, and in specialized industrial environments is not justified at the present time. There is great need for further carefully controlled field studies to define the mechanisms of the spread of infectious disease among these types of populations.

There is no justification for the indiscriminate use of ultra-violet light or other methods for disinfecting air in homes, offices, or places of public congregation.

WILLARD, W. R. (1947.) Some problems in public health administration in the U.S. army military government in Korea.—*Yale J. Biol. Med.* 19. 661-670. 992

The difficulties encountered in the organization of a public health service for liberated Korea is discussed, and some account given of the progress made. One of the greatest difficulties was the attitude of medical officers assigned to public health duty without preparation, some of whom displayed a feeling of resentment. It is emphasized that for this work common sense and willingness to tackle the job are more important than professional knowledge, and that officers must have some training in military government, particularly in public health administration.

The supervising department consisted of public health and welfare branches, the public health branch being divided into sections devoted to communicable diseases, medical services, nursing affairs, veterinary affairs, vital statistics and pharmaceutical affairs. A brief account is given of the action taken to control typhus and smallpox, and the development of laboratory services.—U. F. RICHARDSON.

FILMER, J. F. (1947.) Veterinary services in New Zealand.—*Aust. vet. J.* 23. 79-81. 993

The Veterinary Services Act was introduced in New Zealand in 1946 and provides for a series of co-operative veterinary services for farmers employing salaried veterinarians. This article sets out the aims of the service and responds to some of the opposition. Provisions have been

made to protect the interests of veterinarians already in private practice. The aim is to allow each veterinarian to be of service not only in treating individual diseased animals but also in giving advice on the maintenance of health and increase in productivity, a field that the private practitioner has not been able to cover.

## REPRODUCTION AND REPRODUCTIVE DISORDERS

WARD, A. H. (1947.) *Modern methods of breeding better dairy cattle*.—*Aust. vet. J.* 23. 114-121. Discussion p. 121. **994**

The methods of selection in dairy cattle improvement, with reference to New Zealand conditions of pasture feeding, regular spring calvings, and twice daily milking is reviewed by the director of herd improvement in New Zealand. The qualities aimed for in cows are high production, fertility, resistance to disease and long productive life. The best indications of these are long-term records. The New Zealand lifetime merit register aids selection.

Denmark has a nucleus strain of selected registered cattle for the Red Dane breed. Cows must have a minimum production of 400 pounds butterfat per annum for a three-year period for entry to the register. To aid selection of bulls progeny-testing stations are being formed.

At the Beltsville Research Station (U.S.A.) by using proven bulls and by intense selection of cows, high producing herds of Friesians, Jerseys and Guernseys have been established. From these, young bulls can be sold to dairy farmers with the assurance that approximately 80% or more will improve production.

In New Zealand, 5-6% of all cows under test in any year produce over 400 pounds of fat. The Jersey Breed Society supplies 70-80% of bulls used. An increase in the number of pedigree Jersey cows is needed to provide a better basis of selection of bulls. There appears no good reason why high-producing grade cows should not be added to the pedigree stock.

The author suggests that breed societies should establish a nuclear strain of superior cattle on Danish lines; from which nucleus young bulls may be distributed. The use of artificial insemination to extend the services of proven sires; and before the widespread use of a sire, test matings should be made to prevent the spread of undesirable genes; and veterinarians could assist in identifying and preventing transmission of hereditary defects and disease susceptibility.—G. F. F.

LESBOUVRIES & WIKTOR, T. (1947.) *Diagnostic précoce de la gestation chez la Jument par la méthode de Kurossava*. [Pregnancy diagnosis

A plea is made for the use of properly trained and directed lay assistants in order to increase the veterinarian's field of usefulness and minimise undirected quackery. Criticisms of the Service on the basis of the undesirability of employing salaried professional men are vigorously refuted.

—D. C. BLOOD.

in the mare by examination of vaginal smears.]—*Rec. Med. vét.* 123. 5-16. **995**

Using the method of pregnancy diagnosis described by Kurosawa (1931) which entails visual examination of the vagina and histological examination of vaginal smears, the authors have made 150 examinations of 30 mares. In some cases the examinations were made every third day after service. They found that up to the 21st day the method gave little indication as to whether or not the mare was pregnant. After the 21st day, pregnancy could be diagnosed if the vaginal mucosa was dull, the cervix closed and covered over with thick sparse mucus, and ciliated cells were present in the smears. The mucous globules were seldom observed before the 40th day of pregnancy. The authors conclude that by this method a diagnosis of pregnancy is frequently possible from the 21st day, but can be made with greater certainty from the 40th day.—A. T. COWIE.

BELEN'KI, N. G. (1940.) *K voprosu o biologicheskom deistvii tsitotoksinov na polovuyu funktsiyu*. [Biological effect of cytotoxins on sexual function.]—*Iskusst. Osem. sel'khoz. Zhivotn.* 1. 75-84. **996**

This work is based on Metshnikov's findings, that cytotoxins not only have toxic effects, but that they may also have a stimulating effect on some physiological processes. Other authors believe that the stimulating effect of small doses lies in the partial autolysis of the respective cell protoplasm. It is possible that the stimulation is the result of the activation of products of the autolysis.

Ryabov has succeeded in curing total and semi-impotence as well as azoospermia of stallions and bulls by injecting small doses of testiculo-toxin (0.2 titre units per 1 kg. of live weight). At first the cytotoxic action is apparent as a physiological hyperaemia of the testicles paralleled with an intensification of sexual excitement. Larger doses can have the reverse effect.

It is known that higher quality and more meat can be obtained in poultry by caponization. The present-day method of castration of fowls very often leads to losses. The experiment described was conducted to improve this method

by injecting a larger dose of testiculo-toxins and thus achieve castration.

Forty White Leghorn cockerels 50 days old and of uniform growth and feeding condition were used. They were divided into five groups of eight cockerels each and received intramuscular injections of varying titre (2-16 units per cockerel). After 20 days another injection of testiculo-cytotoxin was given in each group at a higher titre (8-48 units). The volume of each injection was 0.5 ml. The experimental birds were fed along with controls. On the conclusion of the experiment the cockerels were killed and the carcasses examined and valued. The testicles were weighed and measured, and fixed in formalin for histological examination.

Detailed account of the preparation of the testiculo-cytotoxin used is given.

The best results were obtained in the third group injected with 4-16 titre units, and in the fourth group with 2-8 titre units. The average weight increases in these groups were 48 and 68 g. respectively, above the average weight of the control animals. The valuation of the carcasses confirmed the above results. When the amount of feed was compared with the weight increase, the third and fourth groups had made the most economical use of the feeding stuffs.

On histological examination of the testicles of birds injected with the testiculo-cytotoxin there was atrophy, decrease in diameter of the seminal ducts and fatty infiltration.

The increases in weight of the testicles were 2.8-2.6 times above normal in the first and second groups, and 4.0-3.5 times above normal in the third and fourth groups.—K. A. ALLEN.

ANDREEVSKI<sup>1</sup>, V. Y. (1940.) Prichiny porochnosti spermy u baranov. [Reasons for sperm defects of rams.]—*Iskusst. Osem. sel'khoz. Zhivotn.* 1. 36-45. 997

Sperm defects in rams are largely due to anomalies in sexual development, or pathological changes in the sexual organs. The changes have a specific character and can be diagnosed by palpation in the majority of cases. In 4976 Merino rams on nine sheep farms clinical examination of the sexual organs and palpation of the testicles revealed one-sided or both-sided epididymitis, acute and chronic orchitis as well as other pathological defects. 302 rams were tested twice for sperm quality and 71.5% showed various sperm defects. 21 field pathological and anatomical dissections, 32 partial castrations, 18 histological and bacteriological examinations, 726 serological and 604 allergic tests were made during 1936-37 to ascertain the nature and aetiology of this disease.

The changes of the physical properties of the

spermatozoa in healthy and ill rams are discussed in detail and the relation between volume of semen and the nature of the disease is shown in a table. Investigations showed that constant defects of spermatozoa in rams are largely caused by chronic orchito-epididymitis which eventually causes degeneration of the epithelium of the seminal ducts, also cysts and spermiosis. The ejaculates from such rams show a considerable number of defective spermatozoa arising from complete blockage of the seminal channels. Microscopic examination in cases of one-sided orchito-epididymitis shows a mixture of healthy and degenerated spermatozoa, sometimes also a number of round cells of the type of leucocytes. Quick recovery was brought about by the removal of the affected testicle and the quality of semen improved in five cases.

In recent works the cause of orchitis and epididymitis in bulls and pigs was shown to be brucella infection. Only in a small number of cases were brucella cultures isolated from testicles of rams.

A. concludes with the following points:—It is necessary to distinguish between temporary and permanent defects of spermatozoa in rams. Prolonged interruption in the sexual activity of rams can lead to a temporary reduction of the quality of the semen in the first few ejaculates, but after a few days of activity healthy rams regain that quality. The cause of permanent defects of spermatozoa in rams are mostly pathological and degenerative changes in the testicles and seminal ducts. Azoospermia is due to the absence of spermogenesis, or blockage of the seminal ducts, or some disorder of their ejaculative power. Frequent microscopic examination of the semen can give a good indication of the state of health of the sexual organs. When estimating the value of breeding rams clinical palpation of the testicles should always be included. Rams with permanent defects of spermatozoa and pathologically changed testicles should be examined for brucellosis.

—K. A. ALLEN.

SOKOLOVA, L. M. (1940.) Opyt izucheniya uslovnykh polovykh refleksov u baranov. [The study of conditioned sexual reflexes of rams.]—*Iskusst. Osem. sel'khoz. Zhivotn.* 1. 23-35. 998

MILOVANOV recognized four unconditioned mating reflexes of domestic animals, namely, the embracing, the erection, the copulation, and the ejaculation.

In experiments conducted to prove the specificity of the reflexes it was found that the male is willing to embrace not only the female, but also castrates, other males or dummy animals, and not essentially one of the same species. A male animal kept in the herd during the period of

sexual development has an acquired conditioned embracing reflex, as only females "desiring" copulation will allow him to do so, while others will defend themselves and even injure the male. When such a male is transferred from natural to controlled copulation, where the female is boxed in or her movements otherwise hindered, the acquired conditioned reflex gradually changes and after a time the male will mount any female, even a dummy one.

Hogs without exception react on a dummy female, but not all stallions and bulls and only a few individuals amongst rams. This variance in reaction towards the immobile female can be explained by their respective behaviour under natural conditions.

In studies of sexual behaviour in rams a room was divided into two parts by one solid and one fence-like partition. Both partitions could be raised quickly with the aid of counter weights. Each part had an entrance for the animals. The behaviour of the animals could be observed by the hidden experimentator through the system of mirrors. A number of electric bells were installed to be used as irritants. During the experiments absolute silence was maintained as far as possible. Experiments commenced at the same hour of the day during the experimental period. The amount and quality of sperm obtained with or without conditioned irritant was registered. Two forms of hindering were used: The sheep and ram were separated by a fence and copulation was prevented by fastening the tail of the sheep to the abdomen. Two rams were used, the experiments proved a considerable constancy of the embracing reflex of rams when sheep were in the immediate vicinity. The separation of the ram from the sheep by a fence results in the quick development of a hindering complex of the embracing reflex. Rams can develop a conditioned contrasting embracing reflex towards sheep, castrates and dummy sheep. The experimentally obtained conditioned hindering complex of the sexual reflex of rams appears to be unstable and the introduction of a new agent leads to its rapid destruction. It is possible to obtain a larger quantity of semen through preliminary hindering before copulation. (Without hindering 0.7 ml. of semen, after hindering 1.2 ml. of semen). A change of conditions (omission of a conditioned irritant) affects the potency, the quality and quantity of the ejaculation. The aid of conditioned irritants can increase the degree of sexual excitement and the volume of semen. When sound irritants are being used a contrasting sexual reflex can be developed, but other irritants may also be successful.—K. A. ALLEN.

JAMIESON, S., & HARBOUR, H. E. (1947.) Congenital goitre in lambs.—*Vet. Rec.* 59. 102. 999

This article describes an outbreak of congenital goitre in lambs which occurred in Hertfordshire during the spring of 1945. It is the first record of the condition in Great Britain.

The outbreak occurred in a group of 40 yearling ewes, the progeny of a Dorset Horn ram and a half-bred (Border-Leicester  $\times$  Cheviot) ewes. They had been served by an Oxford ram. Thirty of the 40 ewes produced dead lambs, the majority being full-time births but some were premature. All the dead lambs had very little wool and all showed varying degrees of swelling of the neck (up to the size of an orange). Two lambs with very slight enlargement of the thyroids were born alive and these improved and seemed likely to recover. No cases occurred in the progeny of the older sheep on the same farm.

During pregnancy the yearling ewes had received a liberal ration of oats and beans to which was added later some linseed cake. The older ewes were running on grassland and received smaller rations of concentrates and no linseed cake.

P.M. examination showed that the neck swellings were due to very marked enlargement of the thyroid in all cases. One of the enlarged thyroids, asymmetrical in shape, had a third lobe anterior to the main gland and joined to it by an isthmus of thyroid tissue. The surface of the gland showed many engorged blood vessels and fine nodulations. The total gland weighed 51 g. and had an iodine content of 0.0008% fresh weight. The average weight of ten thyroid glands of apparently healthy sheep of similar age, but of the Blackface breed, was 1.71 g. with an average iodine content of 0.035% fresh weight.

On histological examination of the enlarged gland there was scanty colloid in a few acini, and it stained faintly with eosin. The acinar cells, which had a finely granular cytoplasm with small dense nuclei (some with active mitosis), were separated from the basement membrane and varied greatly in size and shape. Some acini had papilliform ingrowths of epithelium, in others the cells lay irregularly in the acinar spaces.

It is suggested, that since losses had not occurred previously on the farm, that the rich feeding and the breeding of the young ewes before they were mature had precipitated the outbreak, although a deficiency in iodine was the primary cause.—F. R. BELL.

DUTHIE, R. C. (1947.) Rhinitis of swine. I. Chronic atrophic rhinitis and congenital deformity of the skull.—*Canad. J. comp. Med.* 11. 250-259. [French summary.] 1000

It was impossible to infect healthy pigs by intimate prolonged contact with diseased animals. Exposure of healthy pigs to pigs that had been

exposed to infected individuals and intranasal instillation of diseased material, likewise failed. Congenital malformation of the upper jaws of young Yorkshire swine was found to be common. This was not encountered in old Yorkshires or in Tamworth swine, suggesting that this malformation has been acquired recently as a result of selective breeding to shorten the Yorkshire head. This congenital deformity can be confused with chronic rhinitis.—P. J. G. PLUMMER.

— (1946.) Discussion on breeding troubles in sheep associated with grazing on Dwalganup clover. [Speakers:—MCKENNA, LINES, LEE, SCHINCKEL, BENNETTS, WATSON, COLLINS & HINDMARSH.]—*Aust. vet. J.* 22. 209-211. 1001

The occurrence of the specific breeding problem of sheep occurring on pastures composed mainly of the Dwalganup strain of subterranean clover in South Australia and on Kangaroo Island was outlined. Fat lambs had been rejected at the abattoirs for the presence of lactating udders. S. reports observations on affected wethers and ewes

*See also absts.* 924 (quality of bull semen); 925 (infertility on upland pastures); 930 (puerperal haemoglobinæmia); 942 (prolan treatment of bulls); 943 (intra-uterine therapy of infertility); 975 (gestation periods); 1025 (genetics).

## ZOOTECHNY

*See also absts.* 1031 (laboratory animals); 1027 (pig breeding).

## TECHNIQUE AND APPARATUS

EDWARD, D. F. FF. (1947.) A selective medium for pleuropneumonia-like organisms.—*J. gen. Microbiol.* 1. 238-243. 1003

A medium suitable for the growth of pleuropneumonia-like organisms and at the same time inhibitory for ordinary bacteria such as occur frequently in the materials tested was sought. The basic medium was prepared from ox heart infusion broth with 1% peptone added. This was enriched by the addition of 20% horse serum and 10% yeast extract; the reaction was adjusted to pH 8.0. This medium proved satisfactory for maintenance. For isolation purposes thallium acetate and penicillin were advantageous, when used in suitable concentrations. They had no ill-effect on the pleuropneumonia-like organisms, yet proved to be bacteriostatic for some of the most troublesome contaminants. The addition of thallium acetate to the medium in which the stock cultures were maintained served as a safety factor.—E. KLIENEBERGER-NOBEL.

GIROUD, P., GIROUD, M.-L., & MEUNIER, M. (1944.) Démonstration d'une méthode rapide permettant la séparation des Rickettsies des tissus et des bactéries acido-résistantes. [A rapid method for separating rickettsiae from tissues and from acid-fast bacteria.]—*Bull. Soc. Path. exot.* 37. 134-136. 1004

from Kangaroo Island. The wethers showed characteristic metaplasia of the bulbo-urethral and prostate glands. The ewes were difficult to settle in lamb and a number were attractive to the ram and were served at varying intervals after conception.—D. C. BLOOD.

BENNETTS, H. W. (1947.) A further note on metaplasia in the sex organs of castrated male sheep on subterranean clover pastures.—*Aust. vet. J.* 23. 10-15. 1002

Active squamous metaplasia occurs in the secondary sex organs of castrated male sheep after grazing on affected pastures for a few weeks. No changes are observed in the entire male. Prolonged administration of stilboestrol to wethers causes identical metaplastic changes and identical regression changes occur on the cessation of treatment. A cul-de-sac develops in the urethra in 1-2% of wethers due to metaplasia of the bulbo-urethral glands, with the formation of cystic dilations and eventually cavities and a single or double cul-de-sac.—D. C. BLOOD.

The method consists of shaking the tissues with different oils such as paraffin or arachis or pine oils and submitting the mixture to fractional centrifugation. No details are recorded.

—L. M. MARKSON.

SHIAN, P. P., & HSIUNG, C. T. (1946.) [Studies on anthrax spore vaccines.]—*Chin. J. anim. Husb.* 6. 22-23. 1005

Owing to the shortage of supply of pure saponin during the war years, crude saponin was used to make carbodox anthrax spore vaccine. It was found that the vaccine thus prepared was as safe and efficient as that made of pure saponin. It was also safe for lambs if the vaccine was injected subcutaneously in the tail instead of the chest wall.—S. J. CHU.

GARDNER, A. D. (1947.) A standardized method of disinfecting infected blood-clots.—*J. Hyg., Camb.* 45. 12-18. [Author's summary copied verbatim.] 1006

A method is described for estimating the disinfecting power of chemical substances on small cylindrical blood-clots of standard dimensions (about 1.5 mm. in diameter) containing a measured number of bacteria (*Staph. aureus*). It is capable of giving guidance for the use of disinfectants under the described conditions. No practicable

disinfectant regularly sterilized heavily infected clots (400,000 cocci) in 5 min. at 17-20°C. In 30 min. the following were the only substances that were uniformly successful with heavily infected clots: 2.5% iodine in aqueous KI solution; 50% chloros, containing about 5% chlorine; 70% alcohol containing 0.1% acriflavine. (The first of the three was tested on a larger scale than the others, and its potency is therefore the more firmly established.) Reduction of the number of cocci in the clot increased the range of effective disinfectant solutions. Thus with 4,000 cocci per clot regular clot disinfection was achieved in 30 min. with the following additional solutions: ethyl alcohol 70 and 50%; chloros 25%; phenol 2.5% and lysol 1.25%. A few tests indicated that zephiran (and probably CTAB) at 1 or 2% concentration would also pass this less exacting test.

KUNST, H. (1946.) Het drogen van virus.  
[Drying of viruses.]—*Tijdschr. Diergeneesk.* 71. 565-567. 1007

Freezing or drying of viruses is superior to preservation in glycerin. Still better is drying in the frozen condition. This method was employed as early as 1911 by HARRIS and SHACKELL for the preservation of rabies viruses.

The use of serum in drying of viruses has the disadvantage that during drying the serum loses carbon dioxide and then becomes alkaline. Drying can be carried out by means of a dehydrating agent or by sublimation at low temperature in high vacuum. At present increasing use is being made of silicic acid and calcium sulphate as drying agents. They are generally coloured with a cobalt salt as indicator: which is blue in the dry state and after absorption of moisture becomes pink. After drying, the tubes should be stored at low temperature in the dark. In this way viruses can be preserved for years.—R. PETER JONES.

CABELL, C. A. (1947.) Oral administration of small doses of liquids to laboratory animals.—*Science.* 105. 370-371. 1008

A simple piece of apparatus enables a worker,  
See also abst. 1026 (laboratory animals).

single handed, to introduce small quantities of liquids into the mouths of small animals such as the rat with ease, speed and accuracy. An all-glass syringe is clamped in a vertical position, to a retort stand by means of a wire test-tube holder. A pair of forceps, used instead of a "hairpin" type of gag, is clamped in a horizontal position to the retort stand so that the points lie about  $\frac{1}{2}$  in. below the point of the syringe needle. The rat is held in the left hand, then its mouth is opened and its tongue secured by the forceps, while the dose is expelled from the syringe directly into its open mouth.—J. KEPPIE.

ANON. (1944.) Hauttaste für die Beurteilung der intrakutanen Tuberkulinprobe. [Skin fold gauge for use in the intracutaneous tuberculin test.]—*Schweiz. Arch. Tierheilk.* 86. 346-348. 1009

A note describing an instrument for measuring the skin thickness in the intradermal tuberculin test. The instrument appears to be of a handy size and convenient to hold in one hand. The jaws and handle have some resemblance to a glove stretcher; at the base of the blades is a circular drum with an indicator showing the distance of the opening between the ends of the jaws.

—E. KLIENEBERGER-NOBEL.

STOLZ, A. (1942.) Malachitgrün-Phenolrotagar und Malachitgrün-Phenolrot-Rohrzuckeragar. [Malachite green, phenol red agar and malachite green, phenol red sucrose agar.]—*Dtsch. tierärztl. Wschr.* 50. 501-505. 1010

For the isolation and differentiation of food poisoning organisms in intestinal content, malachite green phenol red sucrose (M.P.R.) gave the best results, malachite green phenol red (M.P.) came next, and Drigalski-Conradi sucrose was least useful. In 100 bacteriological meat examinations made, only five agglutination tests were required with M.P.R. plates for the elucidation of doubtful results while 32 were needed with M.P. plates.

Four cases of infection with *S. enteritidis* were found in 80 samples examined.—E. CHERKESI.

## MISCELLANEOUS

ANON. (1947.) Il Consiglio Nazionale delle Ricerche e la Scienza Veterinaria Italiana. [The Italian National Research Council of Veterinary Science.]—*Zooprofilassi.* 2. No. 1. pp. 14-17. 1011

The National Research Council of Veterinary Science was formed in 1923; in 1940 a permanent committee was formed to study the diseases of domestic animals; owing to the war it terminated

in 1944. It was, however, able to indicate lines on which the study should proceed, and had started to collect and publish statistics and to suggest standardized methods for the preparation and use of biological products. It also published details of work at clinical, pathological, sero-vaccine and artificial insemination centres. The committee is now being reformed and augmented in numbers and will continue its activities.

—R. MACGREGOR.

## REPORTS

BASUTOLAND. (1946.) Annual report of the Department of Agriculture for the year ended 30th September, 1946. [LECKIE, W. G.] pp. 28. Maseru : Dept. of Agriculture. 1012

Average prices for cattle have risen to a new peak of £12 12s. a head but this coincided with a decrease in the numbers brought for sale.

The number of livestock imported was greater than that exported. The import figures were : 8,847 cattle, 3,448 horses and 20,669 sheep. The exports : 3,088 cattle, 257 horses and 1,168 sheep. Restrictions owing to the prevalence of LUMPY SKIN DISEASE in the Orange Free State reduced the numbers of animals being moved. Many Basuto natives working in the Union of South Africa accept cattle in lieu of wages or to invest savings. This factor among others is tending to cause over-stocking in the Territory.

Malnutrition due to drought and over-stocking is blamed for most of the losses which occur. There were five outbreaks of ANTHRAX controlled by vaccination of incontacts. Losses were low. EQUINE MANGE was widespread.

Mortality due to ANAPLASMOSIS appears to have been mainly among "improved" or imported animals. Sporadic cases of African HORSESICKNESS were reported. Mortality was negligible. Vaccination against FOWL TYPHOID is increasing. "A field exists for research" on other fowl diseases.

LUMPY SKIN DISEASE of cattle was first recorded in Basutoland in June, 1946. No mortality was recorded. It does not affect native cattle so severely as exotic breeds.

520 merino rams were imported for resale to African sheep farmers. This makes the total 6,954 rams imported since 1935 under the Sheep Improvement Scheme. Castration of undesirable bulls and the leasing or transfer of bulls, with auction sales to dispose of surplus and aged animals, have been the main activities of the cattle improvement scheme.

Stallions are maintained at three stud stables situated at Maseru, Mafeteng and Quthing. Others are loaned to natives for outlying districts under the equine improvement scheme. The advisability of continuing the use of thoroughbred stallions exclusively is being reconsidered owing to their offspring being "too fine" for mountain travel and pack work. There is an increased demand for donkey jacks for mule breeding.

Pig breeding is being encouraged by the distribution of weaners, the offspring of four sows and two boars, one Tamworth and one large black.

The main problems in the Territory are erosion of the soil and malnutrition of livestock from overstocking.—J. A. GRIFFITHS.

CANADA. (1946.) Report of the Science Service. Dominion Department of Agriculture for the year ended March 31, 1946. pp. 88. Ottawa : Reprinted from the report of the Ministry of Agriculture for the year ended March 31, 1946. Itemsofveterinaryinterestpp.19-22,80-87. 1013

The science service of the Dominion Department of Agriculture was established in 1938. This includes the research divisions of animal pathology, bacteriology and dairy research, botany, chemistry, and entomology.

In the division of animal pathology studies on swine fever virus show that doses as small as 1/100,000 ml. proved fatal to pigs and these small doses were equally fatal when given orally. Doses so small that they do not produce symptoms do not set up an immunity.

Experiments to produce immunity against INFECTIOUS ANAEMIA did not prove satisfactory with a crystal violet vaccine produced as in preparing swine fever vaccine. Cross immunity experiments show the virus of chorio-meningitis does not produce an immunity to infectious anaemia virus. The virus of fowl LEUCOSIS could not be transmitted through the egg or in direct or indirect contact trials with birds of various breeds. PULLORUM DISEASE is being controlled by tests using a mixed antigen made up of the regular and new types of the organism. 3½ million doses were issued. It was established that turkeys are susceptible to pullorum disease. BOVINE CONTAGIOUS ABORTION studies show that provided the number of viable organisms exceeds an established amount, any further increase does not appear to exert a direct influence on the serum response of individual animals. Penicillin gave good results in the treatment of bovine MASTITIS. Large-scale field trials are being carried out with the co-operation of practising veterinarians. TB. in pigs was found to be mainly due to the avian type of the organism. Only 2% of cases were due to the bovine type and 1:480 to the human type. In the control of COCCIDIOSIS of poultry sulphonamides [not specified] were found to be effective. The cost is said to be one cent daily for six days after the birds are placed on infected floors. As the birds at this stage are worth 50 cents the method is economically sound. The exposure results in an immunity. In the treatment of ANAEMIA of suckling pigs feeding iron to the sow was without effect on the disease in the young pigs. A minimum of three doses at intervals of a week to the young pigs gave the best results. The first should be given when they are a day or two old. Pigs were found to tolerate up to ½ lb. of salt daily for three months but there

was microscopic evidence of kidney damage. Nitrite and nitrate of potassium are much more toxic. RHINITIS of pigs could not be transmitted by contact or the inoculation of the organisms present in affected pigs.

There is some evidence of the source of the condition known as BOVINE HAEMATURIA being in the soil. Experiments were in progress.

The laboratory services carried out 156,836 bovine contagious abortion tests, 7,522 tests for PULLORUM DISEASE and 1,877 P.M. examinations and diagnosis of specimens.

Biological products issued included tuberculin 1,692,130; mallein 38,786; johnin P.P.D. 1,142; *Brucella abortus* antigen 93,946; and pullorum disease antigen 479,500.

The investigations of the division of entomology included a study of the role of insects in the distribution of EQUINE ENCEPHALOMYELITIS, the study of the life history and the control of warble fly. Over a million and a half cattle were treated for warble infestation. The widespread use of D.D.T. for the control of flies, bedbugs, lice, cockroaches and other troublesome pests on farms and in lumber camps has greatly reduced the incidence of diseases spread by these insects. Powders containing 3%, 5% and 10% D.D.T. and emulsions containing 0.25% and 0.5% D.D.T. were effective in ridding cattle of lice. Four oz. of powder or three pints of emulsion was enough for each animal.—J. A. GRIFFITHS.

CANADA. (1947.) Report of the Veterinary Director General for the year ended March 31, 1946. [BARKER, M.] pp. 87. Ottawa: E. Cloutier. 1014

There was an acute shortage of staff in the division of animal health. Forty-two veterinary inspectors and eight lay inspectors resigned. Six veterinary and seven lay inspectors retired and five veterinary inspectors and two lay inspectors died. Twenty-three veterinary inspectors and 72 lay inspectors were appointed. Five veterinary and five lay inspectors returned from military service.

In the contagious diseases section there were no reported cases of ANTHRAX, DOURINE, GLANDERS or SHEEP SCAB since 1946, 1919, 1939, 1927 respectively. Four cases of EQUINE MANGE occurred. 102 sheep infected with SCRAPIE in a flock in Ontario Province were slaughtered.

Outbreaks of RABIES have occurred in Ontario. Thirty-four animals were affected. Twelve dogs, four cattle and one cat in Essex county; 14 dogs in Kent county; two dogs and one pig in Lambton county. There were six outbreaks of SWINE FEVER in Nova Scotia and four in Ontario which involved 228 pigs. Compensation of \$1,857 was paid. Cattle tested for

TUBERCULOSIS were Accredited Herd plan 302,755 and 0.15% reacted; Area Testing 438,300 and 0.58% reacted; Supervised Herd plan 57,800 and 0.5% reacted.

In the 101 establishments under the inspection of the meat and canned food section 1,801,112 cattle were slaughtered; 771,272 calves; 1,282,551 sheep; 5,038,072 pigs; 7,895 horses; 462 buffalo; 152 elk; 1,180,442 poultry and 139 goats. A large decrease occurred in the numbers of pigs slaughtered. 2,845,107 (-36.11%) fewer pigs' carcasses were inspected and there was 9.93% decrease in poultry; cattle and calves (+ 18.07%) and sheep (+ 31%) slaughtering increased. Most of the cattle slaughtered came from Manitoba 27.19%, Ontario 24.65%, Alberta 18.30%, Quebec 12.25%, Saskatchewan 9.86% and British Columbia 6.98%. The main causes of condemnations were:—in cattle: TB. 26.14%, and emaciation and mucoid degeneration 21.50%; others were pyaemia and septicaemia 6.08%, mammitis 5.75%, pneumonia 5.72%, peritonitis 4.58% and also some with metritis, pericarditis and arthritis. In calves: immaturity 54.75%, and emaciation and mucoid degeneration 22.95%. In sheep: emaciation 45.97%, pneumonia 19.05%, and pyaemia 6.23%. In pigs: arthritis 31.7%, tuberculosis 21.71%, pyaemia 8.03%.

Of the mature cattle slaughtered 4.98% were bulls, 38.89% steers, 33.96% cows and 22.17% heifers. The average dressed weights per carcass were beef 484 lb., veal 121 lb., mutton 51 lb., lamb 42 lb., pork 163 lb., horse 670 lb.—J. A. G.

NIELSEN, F. W. (1947.) Combating of tuberculosis among cattle in Denmark.—*Vet. J.* 103. 252-259. 1015

In 1942 legislation in Denmark enabled a tuberculosis eradication scheme to be carried out among cattle. Regulations were passed for the preventative measures against spread of infection, the buying and selling of tuberculin tested animals, and the tuberculin test.

By this legislation everything is made easy for the farmer with the tuberculin tested herd, whereas the owner of the non-tested stock is penalized by many irksome and sometimes costly regulations [e.g., it is the owner of the non-tested stock who must prevent the spread of infection to his neighbour's tested cattle by double fencing, also the milk from these "dirty" herds must not be delivered to the dairy till all "clean" milk has been collected and processed, and then it must be delivered at the farmer's own expense.]

The co-operative dairies have authority to pass bye-laws in order to encourage eradication in their areas. A typical set is given.

A table of annual progress since 1937 is given in which year 48.5% of the herds were being

tested and 26.5% were free. In 1946 99.3% were being tested and 93.9% were regarded as free.

Figures are given relating to the cost to the state. In 1936 6,000,000 kroner were paid in grants in aid and in compensation, whereas in 1946 the figure had fallen to 350 kroner.

The scheme has been so successful that attention is now being focused on the eradication of brucellosis.—J. DEANS RANKIN.

EIRE. (1946.) **Fifteenth annual report of the Minister for Agriculture 1945-46.** [O'RYAN, J.] pp. 159 + [84]. Items of veterinary interest pp. 36-48, 72-77. Dublin: The Stationery Office. 3s. 6d. 1016

In the Veterinary College there were 239 students including 38 freshmen, ten passed with honours; 52 graduated.

INFERTILITY of bulls continues to be a serious loss to breeders. Semen examinations reveal local infections of the reproductive tract.

Of the 131,580 specimens examined, 127,600 were of poultry, 1,791 general pathology, 1,078 parasitology and 1,111 canned foods.

There were 1,205 specimens from cattle. 540 were milk samples. Of these 338 were negative, 101 streptococcal, 50 staphylococcal and 41 mixed streptococcal-staphylococcal infection. 490 contagious abortion blood agglutination tests gave 17.75% reactors. There were 96 P.M. examinations on cattle sent to the college. Of the 201 specimens from horses 107 were uterine swabs from mares. Eleven of these showed HAEMOLYTIC STREPTOCOCCAL infection. Eighteen cases of FISTULOUS WITHERS and POLL EVIL showed a high titre of *Br. abortus* agglutinins in seven animals. 107 dog specimens included 24 haemorrhagic GASTRO-ENTERITIS, seven STREPTOCOCCAL SEPTICAEMIA, seven LEPTOSPIRAL JAUNDICE, six HEART DISEASE, eight DISTEMPER and NEPHRITIS and also some of MENINGO-ENCEPHALITIS, VENEREAL GRANULOMA, CARCINOMA, SARCOMA, ENDOTHELIOMA, MYXOMA and FIBROMA.

The main diseases of pigs diagnosed were SWINE INFLUENZA, PIGLET ANAEMIA, LYMPHATIC LEUKAEMIA, TUBERCULOSIS, GASTRO-ENTERITIS (dietetic ?), SWINE ERYSPELAS, METRITIS, sporadic PNEUMONIA and STREPTOCOCCUS SEPTICAEMIA of piglets. Among cats INFECTIOUS ENTERITIS was the most prevalent complaint. The sheep diseases diagnosed included ENTERO-TOXAEMIA, LOUPING-ILL, MALIGNANT OEDEMA and BRAXY. FURUNCULOSIS was found among the fish specimens.

1,078 PARASITOLOGICAL specimens included: 366 from the horse. Of these 91.5% were "red worms", 8.2% "red worms" with ascaris and 0.3% ascaris only. Of five skin scrapings one showed lice, one leg mange and three were negative.

446 from cattle:— These were 61.6% "bowel" worms and 38.4% with both "bowel" and "liver fluke" worms. Among the above 16.7% had coccidia and 1% lung worms. Of three skin scrapings one showed chorioptic mange and lice, two were negative, seven P.M. examinations showed heavy helminth infestations.

A few specimens of faeces from sheep, pigs and dogs were also examined.

*Fasciola hepatica* infection is reported to have been observed in the livers of two wild rabbits.

127,600 specimens were examined in the poultry section, of which 122,962 were tests for B.W.D. No details are given of the findings in the remaining specimens.

Bacteriological and biochemical investigations were also carried out on canned foods, bacon, ham and raw meat.

Clinical department: The college clinic dealt with 7,491 internal and 492 external patients:— 1,543 horses, 385 cattle, 57 sheep, 264 pigs, 5,304 dogs, 399 cats, 11 poultry, three ferrets and 17 rabbits.

12,954 specimens were examined in the research laboratory:— 3,170 BOVINE CONTAGIOUS ABORTION, 1,150 TUBERCULOSIS, 6,906 MASTITIS (non-tubercular), 48 equine uterine swabs, 1,393 faeces, one case of PSOROPTIC MANGE, 109 miscellaneous specimens from veterinary surgeons.

There were 467 biological tests for diagnosis or research work. 128,006 vaccine doses were issued to veterinary surgeons.

Research on BOVINE MASTITIS and infertility in bovines in addition to the work on BOVINE CONTAGIOUS ABORTION is carried out at Thorndale. The work on contagious abortion shows that the strain 19 vaccine is not by any means 100% effective but it protects the majority of vaccinated animals. No beneficial result was obtained by increasing the quantity of the dose of vaccine in an experiment carried out in 1943. There is a risk of infection. Four of the animals of 15 vaccinated showed persistent blood reactions.

In a survey of dairy herds for MASTITIS a total of 133 cows had 84 infected. Of the 153 quarters showing disease 91 were streptococcal, 45 staphylococcal and 17 mixed streptococcal-staphylococcal. Penicillin therapy of mastitis has been tried and has shown some encouraging results, particularly against *Streptococcus agalactiae*.

*Trichomonas foetus* infection was encountered in six uteri examined. The disease is probably more prevalent than is at present apparent.

—J. A. GRIFFITHS.

INDIA. (1945.) **Annual Administration Report of the Army Veterinary Service in India for 1944-45.** [DURNFORD, C. M. P.] pp. 51.

Numerous tables. New Delhi: Govt. India Press. **1017**

Considerable expansion brought the strength of the service up to 225 R.A.V.C. officers, 345 veterinary assistant surgeons with necessary increase in other branches. The units maintained included 13 Class I, 13 Class II and 24 branch hospitals, also an officers' training school as a branch of the Corps Records, at which ten courses were held and 200 officers trained. Training courses in other subjects, such as farriery, were held.

There was a high incidence of ANTHRAX among the large numbers of sheep and goats exported from India (Tuticorin) to Ceylon (some 11,000 monthly from August). Losses were high in the two countries and during transit; 8,264 deaths occurred in eight months, due to heavy contamination of the grazing pens at the port. A spectacular fall in incidence followed a complete change of system, involving veterinary supervision from time of purchase to slaughter and strictly limiting the time spent at the embarkation port. GOAT PNEUMONIA was a serious and unsolved problem in animals being sent to forward areas. RINDERPEST on the military farms was mostly in newly purchased buffaloes before they could be immunized. In slaughter cattle intended for the forward areas mortality was very low on the whole, thanks to systematic inoculation. Many sheep and goats were treated with serum and goat virus, apparently with success, reactions being rather more severe in sheep. SURRA was the most serious animal problem in the Burma campaign. Large-scale control was developed on systematic lines using anti-surra units and was based on microscopical examination of blood films to detect early cases and treatment, mainly by antrypol administered intravenously in maximal dosage and according to a schedule (0.4-0.6 g. per 100 lb. live weight—estimated by formula from body measurements), supplemented by calcium lactate to reduce toxicity of antrypol. Incidence was reduced from 17% of animal strength effected in one season to 7% and finally to 2%. As a preventive for maintaining animals in military work during the fly season, antrypol at 0.5 g. per 100 lb. every 21-28 days was effective. *Cryptococcus infection* (EPIZOOTIC LYMPHANGITIS) was difficult to control in spite of adopting modern methods, viz., fly control, keeping affected units in working isolation, examination of all wounds for cryptococci. Among other diseases mentioned are STRANGLES (sulphanilamide successful in early cases), PIROPLASMOSIS in imported donkeys, THEILERIASIS, SWINE PARATYPHOID, RANIKHET DISEASE (Muktesar vaccine efficient).

A few details are mentioned of the valuable work of F. W. PRIESTLEY at the Military Labora-

tory, Lahore, on diseases of buffaloes, viz., MASTITIS (chiefly *Str. agalactiae*), calf mortality (chiefly SALMONELLOSIS), BRUCELLOSIS and retained placenta.

The report brings to light the increased responsibilities and scope of the service, in respect of inspection of fresh meat, supervision of livestock numbering some 670,000 transported for feeding troops, working of local food production schemes for meat, poultry and eggs, early pregnancy diagnosis. The director points out that heavy mortality occurred at times in the production plants and attributes this mainly to inexperience and "insufficient knowledge in animal husbandry or supervisory personnel" [referring presumably not only to veterinarians].

The great economic value of the pregnancy diagnosis work is stressed.

Other items of interest concern saddle injuries—and the development of a plastic operation therefore, muting of equines by excision of vocal cords, and parachuting of mules from aircraft.

The assistance of the Mukteswar Institute is acknowledged.—F. C. MINETT.

**INDIA. (1946.) Annual administration report of the Army Veterinary Service in India for 1945-46.** pp. 23. Mimeographed. **1018**

The Service strength had fallen slightly by March, 1946, due to releases, though the numbers of hospitals remained about the same. The incidence of ANTHRAX had fallen, while PNEUMONIA of sheep and goats remained a serious menace. CRYPTOCOCCUS infection claimed a good deal of attention. The disease remained confined to units returned from South-East Asia Command where it was widespread. About 30 units with 5,000 animals were involved and in one month there were 39 cases. Movement of animals from Burma to India was stopped and in-contacts were segregated. Some work was done on "cryptococcin", prepared from broth cultures of *Cryptococcus*. It was proved that the reagent would produce a skin reaction in some clinical cases and apparently in many non-clinical cases, but experimental work was handicapped by the military necessity of disposing of reactors before their status could be determined.

The report of the military veterinary laboratory again deals with BRUCELLOSIS in buffaloes and SCOURS in buffalo calves. Other work was concerned with ulcerative NECROSIS (of face and extremities) of young pigs, goat PNEUMONIA (culture vaccines gave best results), RINDERPEST in buffaloes (lapinized vaccine unsatisfactory), abortion in mares (probably *S. abortus equi*).

A special section deals with the military farms, with details of herds strength and composi-

tion, sickness. F. & M. disease caused great economic loss, e.g., foul-in-the-foot was a common sequel. Measures to prevent introduction to the farms failed. THEILERIASIS is prevalent in Baluchistan. TB. has high incidence in herds kept in the hills (close confinement during winter). CALF-PNEUMONIA was common. A large number of rectal explorations for pregnancy diagnosis was made and this work continues to be the greatest economic value.—F. C. MINETT.

INDIA, ORISSA. (1947.) Annual report of the Civil Veterinary Department, Orissa, for the year 1943-44. pp. 20 + xxvii. 2 appendices. Cuttack : Orissa : Govt. Press. [Rs. 1.11.6 or 2s. 7d.] 1019

Livestock activities were transferred to the veterinary department in April, 1944, and a government farm established. There is also a small dairy farm for trial of Haryana cattle under Orissa conditions and a farm for experiments on wool improvement. Owing to the war, the normal channels of livestock trade were much dislocated and export of cattle and other stock for slaughter had to be regulated.

The statement of mortality shows there were 1,891 recorded deaths as compared with 1,978 the previous year. Out of a total of 2,105 cases of RINDERPEST 520 occurred in cattle and 119 in buffaloes. From a total of 280 attacks of HAEMORRHAGIC SEPTICAEMIA 184 occurred in cattle and eight in buffaloes. There were 85 cases of F. & M. disease and 73 cases of BLACKQUARTER in cattle. Other diseases of which occurrence is mentioned are FASCIOLIASIS (especially in buffaloes), nasal SCHISTOSOMIASIS (in cattle, not buffaloes), "HUMP SORE", and RANIKHET DISEASE. The numbers of outbreaks and deaths of the principal diseases are also tabulated by districts.

Numbers of bovines inoculated against RINDERPEST, HAEMORRHAGIC SEPTICAEMIA and BLACKQUARTER were 803,238. Of these, 291,476 were given goat tissue vaccine alone, prepared at the new station opened at Cuttack. There is reason to believe that as a result of these inoculations widespread outbreaks occurring at the time in S. India were prevented from spreading far into Orissa.

At the eight veterinary hospitals and dispensaries 740 in-patients and 52,275 out-patients were treated and 5,264 cattle were castrated. Also, 145,039 animals were treated by veterinary assistant surgeons on tour, who also castrated 34,750 cattle.—F. C. MINETT.

INDIA, SIND. (1947.) Annual administration report of the Civil Veterinary Department, Sind, for the year 1945-46. [BAWA, H. S.] pp. 24. Karachi : Govt. Press. 1020

The staff consists of three veterinary inspectors, 27 veterinary assistant surgeons, 20 compounders and two disease investigation officers. The total animal mortality amounted to 7,928 as compared with 4,876 of the previous year. The causes of death being as follows :—RINDERPEST 1,005 (429) in cattle and 1,723 (114) in buffaloes, HAEMORRHAGIC SEPTICAEMIA 231 (211) in cattle and 600 (528) in buffaloes, FASCIOLIASIS 290 in buffaloes and 527 in sheep, PLEURO-PNEUMONIA of goats 592, RANIKHET disease 554. Among other important diseases noted were SURRA in horses and camels; F. & M. DISEASE in cattle, buffaloes and goats, ANTHRAX, AGALACTIA and goat DERMATITIS (first discovery as distinct from goat-pox); 42 cases of RABIES in dogs; FOWL-POX, RANIKHET DISEASE and SPIROCHAETOSIS in poultry; MANGE in camels.

During the year, 41,063 preventive inoculations were carried out, including 32,485 cattle with goat virus against RINDERPEST, 8,155 cattle against HAEMORRHAGIC SEPTICAEMIA, 647 cattle and goats against ANTHRAX, 6710, with formalized lung tissue against goat PLEURO-PNEUMONIA.

At the 37 veterinary hospitals and dispensaries a total of 48,201 cases (49,580) were treated. In addition, 14,389 cases were supplied with medicines. There were 6,137 bovine castrations. Further treatments were carried out by provincial veterinary assistant surgeons on tour, viz., 61,519 cases (45,714) and 5,505 (4,946) bovines were castrated. At the end of the year there were 139 (159) approved bulls and 3,736 (4,640) cows were served by them. Thirty-three cattle and camel fairs and shows were held, at which 7,812 animals attended.—F. C. MINETT.

KENYA. (1943.) Annual report of the Veterinary Department, 1942. [DAUBNEY, R.] pp. 18. Nairobi : Govt. Printer. [8vo.] 1021

The output of dairy products and pig production was well maintained at the level of the 1947 figures. During the year the purchasing of cattle by the Livestock Control increased to a total of 118,418 cattle. Of these 100,854 were from Kenya, 11,503 from Uganda and 6,561 from Somalia. 14,392 of the cattle purchased were selected for issue to farmers.

In the settled areas 38 outbreaks of EAST COAST FEVER occurred in clean areas, in most cases only one or two deaths occurred. There were 53 outbreaks of RINDERPEST mainly due to illicit movement of cattle or through infected game. The methods used for control were inoculation of attenuated virus 67,877, vaccine-virus 7,889, vaccine only 18,551, virus-serum 1,119.

The Laikipia outbreak of BOVINE PLEURO-PNEUMONIA was controlled by quarantine and

vaccination. There were substantial losses on some farms. In May infected oxen distributed to farmers by the livestock control caused a serious situation. This outbreak in South Nyeri, Laikipia and Thika district was controlled by testing and slaughter of infected and in-contact animals.

Ten outbreaks (18 cases) of RABIES were reported in Lumbwa district. There have been further extensions of TRYPAROSOMIASIS.

In the native areas the introduction of free inoculations against RINDERPEST increased the numbers treated to 1,253,597 compared with 113,508 in 1941.

Fresh outbreaks of BOVINE PLEURO-PNEUMONIA occurred in Mau area of the Masai Reserve. There is a reluctance to the inoculation of vaccine in non-infected herds. Good results in control by vaccination were obtained in Samburu Reserve and in South Kavirondo. The general position of TRYPAROSOMIASIS has not altered. There is an increased demand for treatment of infected animals. The drugs used are phenanthridinium and stibophen. Fresh cases of RABIES occurred in North Kavirondo. There seems little tendency for the disease to spread.

The largest increases of sera and vaccine production are in attenuated goat virus from  $2\frac{1}{2}$  to  $5\frac{1}{2}$  million doses and pleuro-pneumonia culture vaccine nearly doubled to 1,194,834 doses. Anthrax and blackquarter vaccines also show large increases. There is a reduction in anti-rinderpest serum and horse sickness and entero-toxaemia vaccines. The revenue increased to a total of £28,837. Routine diagnosis included 7,605 slides and specimens examined and over 10,000 complement-fixation tests for BOVINE CONTAGIOUS PLEURO-PNEUMONIA.

The Kabete attenuated goat virus (K.A.G.) for RINDERPEST was in its 350th serial passage. "All batches of this desiccated virus were roughly titrated by the inoculation of cattle before issue". Shortage of susceptible cattle and goats made serial inoculations impossible with the Dickinson, Douglas and Mt. Margaret strains. It is thought the K.A.G. virus is not virulent for giraffe, buffalo, Thomson's gazelle, Coke's hartebeest, oryx and eland but this is based only on contact experiments with K.A.G. reacting cattle. The results are admittedly inconclusive. Giraffe, buffalo, oryx, bushbuck, and duiker were infected by inoculation with K.A.G. virus. Some buffalo and one giraffe resisted K.A.G. infection.

Two new strains of virus from South Africa have been incorporated in the vaccine issued for HORSE SICKNESS and the dose has been increased in quantity. There were a few breakdowns and deaths among inoculated horses. The problem of the value of using vaccines prepared from mixed

strains is under investigation. Reports from the Sudan indicate Kabete vaccine has given satisfactory results in the inoculation of large numbers of horses.

The African buffalo is susceptible to MALIGNANT CATARRH. Examination of stained smears and fresh material by the dark ground method failed to confirm the finding of spiral organisms by Goetze.

More than 10,000 complement-fixation tests were made for CONTAGIOUS BOVINE PLEURO-PNEUMONIA and in many cases diagnosis was confirmed by P.M. examination. The results of the tests show:— all acute cases and lungers react; early cases will react positively a week before the first rise of temperature or other clinical sign; it is necessary to test an infected herd more frequently than at intervals of three weeks from a negative test; there are about 1% of false results; in East Coast fever areas some false reactions occur. Factors causing apparently normal culture to result in severe reactions were under investigation (Purchase). The virulence of a strain is rapidly increased when introduced into the lungs by agar-embolus technique, but not by several subcutaneous passages.

Serious mortality occurred in sheep inoculated with freshly prepared enterotoxaemia vaccine. This was found to be due to unneutralized toxin capable of causing a severe local lesion. Incubation of the vaccine for a few days rendered it safe.

TRYPAROSOMIASIS was treated with stibophen and the phenanthridinium compound S897. Results with 49 cattle with stibophen were 21 cured, eight died and 20 relapsed within three months after receiving three doses at weekly intervals. Of 50 animals given a single dose of 1.5 mg. phenanthridinium per kg. body weight, 28 were cured and 22 relapsed. Of 12 animals that relapsed after treatment with stibophen, eight were cured by a single injection of phenanthridinium. 80% to 90% of infected animals in another herd recovered after treatment with phenanthridinium.

An interim report by Lewis on experimental control of *Glossina pallidipes* in the Lambwe Valley area of S. Kavirondo shows this species can be controlled by a combination of trapping, hand-catching and protective clearing of bush. It is not necessary to destroy all bush in infected areas; in some areas advantage can be taken of adverse conditions which periodically cause natural recession of the flies.

*Glossina austeni*, reared in the laboratory, transmitted *Trypanosoma congolense* under laboratory conditions to cattle, sheep, goats, African buffalo, oryx, rabbits, mules and dogs.

In a test of the susceptibility of African buffalo to EAST COAST FEVER and their ability to infect ticks with *Theileria parva* one buffalo showed a minor thermal reaction, Kock's bodies in gland smears and a few piroplasms in the blood, but recovered. Ticks fed on this buffalo transmitted fatal East Coast fever to several cattle but not to another buffalo.

Copper deficiency is thought to be a factor associated with a high incidence of still-born calves. A lick containing increased amounts of iron and copper was fed to affected cows, apparently with complete success.

SWEATING SICKNESS can be cured and prevented by repeated administration of ferrous sulphate.

It is confirmed by HUDSON and HEMPSHIRE that the untreated animal with NAKURUITIS has a cobalt deficiency amounting to only one-fifth of the cobalt found in normal livers.

Difficulties were encountered owing to failure of the short rains and in obtaining concentrates usually available for livestock feeding. Owing to the increased purchasing of livestock by the live stock control, the numbers purchased in 1942 in the native reserves were nearly five times those marketed before the war. A large amount of the meat issued as military rations is consumed by Kenya natives.

Reproduction studies have been continued at the Naivasha experimental station.

The veterinary centres in the native reserves have continued their activities.—J. A. GRIFFITHS. U.S.A., STATE OF CALIFORNIA. (1942.) Department of Agriculture. [Report of] Division of Animal Industry. [DUCKWORTH, C. U.]—Bull. Calif. Dep. Agric. 31. 257-286. 1022

California imported 602,926 animals in 1942. These included 12,504 dairy cattle, 99,296 beef cattle, 483,984 sheep and 4,787 equines.

BOVINE TUBERCULOSIS eradication is carried on in co-operation with the U.S.A. Bureau of Animal Industry. 1,242,325 cattle were tested and 0.2% reacted. All counties are modified accredited tuberculosis-free areas, infection being less than 0.5%. Reactors are disposed of in the slaughter plants. Reports of tuberculosis lesions found in carcasses by meat inspectors are followed up by the inspection of the herds of origin, special tests being made to eliminate the disease. Tuberculin is only supplied to veterinarians approved by the Bureau of Livestock Control.

In the voluntary control scheme 21,997 cattle were tested for BRUCELLOSIS. Calves are inoculated at 4-8 months of age and agglutination tests are made 30 days later. Non-reacting calves are revaccinated.

A voluntary control scheme in its third year

was being worked for PULLORUM DISEASE. 31,274 turkeys and 18,416 chickens were passed free from infection. Thirteen outbreaks of SWINE FEVER were dealt with in four countries.

SWINE ERYSIPelas is said to be fairly widespread. 11,313 tests were made and 14 equines (11 mares and three geldings) reacted to DOURINE. The importation of horses from Mexico and Indian reservations in Arizona for dog food is strictly supervised.

A case reported by a veterinary practitioner reacted to the mallein test and proved to be a clinical case of GLANDERS. The owner had two ranches and five horses reacted on one ranch and one on the other. Another infected horse was found on a third ranch. The number of reactors was seven horses and one mule of the total of 23 horses and two mules. Seventy-one equine contacts were negative to the mallein test. The origin of the outbreak was not determined. One of the reactors had been purchased in San Francisco four years before.

Cattle tick eradication measures to control TEXAS FEVER were enforced when *Boophilus annulatus* was found on cattle. Dipping is at intervals of 14 days. The ticks found were not infected with *Piroplasma bigeminum*.

Five outbreaks of BOVINE BACILLARY HAEMOGLOBINURIA (*Clostridium haemolyticus* infection) were reported accompanied by a high mortality. The illness is of short duration but is controlled by annual vaccination of cattle.

ANTHRAX was very prevalent during the summer and autumn. 169 cases were reported. These were 127 cattle, 28 pigs, 14 horses and five sheep; vaccination of in-contacts and burning of carcasses are enforced.

EQUINE ENCEPHALOMYELITIS was widespread during the summer and autumn months. 267 cases were reported and of these 33.7% died. 8,855 equines were vaccinated by veterinary practitioners.

15,910 specimens were examined in the animal pathology laboratory, Sacramento. Cattle diseases diagnosed included ANTHRAX, ACTINOMYCSES, BLACKLEG, COCCIDIOIDAL GRANULOMA, COCCIDIOSIS, MASTITIS and TB. Cattle parasites identified included *Sarcoptes scabiei*, *Demodex bovis*, the lice *Linognathus vituli*, *Bovicola bovis* and *Hematopinus eurysternus*, the ticks *Ambylomma*, *Boophilus annulatus*, *Dermacentor albipictus*, *D. occidentalis*, *D. variabilis*, *Ixodes ricinus*, and *Ornithodoros megnini*, and roundworms *Dictyocaulus viviparus*, *Ostertagia ostertagia* and *Trichuris ovis*.

There were six cases of equine ANTHRAX and one of TB. infection. The chief goat diseases recorded were MASTITIS and PNEUMONIA.

Two cases of ANTHRAX and one each of TETANUS, ACUTE GASTRO-ENTERITIS, KERATITIS and LAMMING PARALYSIS occurred in sheep.

In pigs there were 11 cases of ANTHRAX, three SWINE FEVER, four SALMONELLOSIS, three ENTERITIS, one NEPHRITIS and one ARTHRITIS. Seventy-eight different disease conditions were found in the 974 poultry specimens examined. 517 of these were from chickens and 454 from turkeys.

Diagnosis of disease outbreaks and pullorum tests are the main work of the poultry pathological laboratory, Los Angeles. 1,974 P.M. examinations were made. Altogether 4,843 specimens were examined. Pullorum tests made included 128,414 of chickens and 253,562 of turkeys. The reactors were 0.78% and 1.2% respectively.

There were fewer cases examined in the poultry pathological laboratory, Petaluma than in 1941. A severe outbreak of infectious catarrhal enteritis occurred. In most other diseases there was a decrease in the number of cases. Total of specimens examined was 1,668 cases and 4,380 specimens.—J. A. GRIFFITHS.

U.S.A., STATE OF CALIFORNIA. (1943.) Department of Agriculture. [Report of] Division of Animal Industry. [DUCKWORTH, C. U.]—Bull. Calif. Dep. Agric. 32. 337-363. 1023

There were 601,709 animals imported. They included 162,669 cattle, 430,797 sheep and 8,243 equines.

764,650 cattle were tested and only 944 reacted in the control of bovine TB. These reactors were slaughtered and the herds from which they originated were retested. The same procedure applies to animals found showing lesions of tuberculosis when the meat is inspected.

Under the voluntary control plan for BRUCELLOSIS there were 14,851 cattle in 438 herds. Brucellosis-free certificates were issued to 76 of these herds. These certificates are issued after three successive tests have been passed and it is renewed annually if the herd is free from the disease on retest. Calves are vaccinated annually at 4-8 months of age.

Twenty-five outbreaks of BACILLARY HEMOGLOBINURIA due to *Clostridium hemolyticus* infection were reported. No outbreaks of DOURINE were recorded.

A nervous disease of cattle and sheep is characterized by loss of co-ordination of the limbs. After walking a short distance with an unsteady gait, those badly affected make a few rapid and stilted jumps and then fall over. They lie for a time in a rigid condition and gradually relax. After a time they get up with difficulty and may then repeat the performance. No beneficial results have followed the feeding of various minerals in the ration or supplementary feeding

to supply supposed deficiencies in the diet. The only remedy so far has been to remove the animals to fresh pastures and change the supplementary ration.

SWINE FEVER was widespread, 22 counties were involved.

There were no outbreaks of TEXAS FEVER (Redwater) due to *Babesia bigemina*. Dipping was carried out in a herd of Mexican cattle found infested with ticks (*Boophilus annulatus*).

EQUINE ENCEPHALOMYELITIS was widespread. It was more extensive in the Northern and Central areas than in the South. 760 cases were reported by veterinary practitioners with 27.1% deaths. They also vaccinated 19,238 horses and mules.

ACTINOMYCOSIS appears to be increasing in its incidence in some areas. Both *Actinomyces bovis* and *Actinobacillus lignieri* infections occur.

Helminth infestations were controlled by the use of phenothiazine for nematodes and carbon tetrachloride for liver flukes.

The control scheme for PULLORUM DISEASE is in its fourth year. 173,415 turkeys and 19,038 chickens were tested. Figures of turkey reactors are not given but chickens were 100% free from infection. In a total of 482,431 PULLORUM DISEASE tests there were 0.5% reactors.

Details are given of the diseases diagnosed in the 2,659 specimens examined at the animal pathology laboratory, Sacramento.

Details are also given of the 2,912 birds and other species examined P.M. at the poultry pathological laboratory, Los Angeles.

INFECTIOUS CORYZA continues to be of great economic importance. Sulphonamides are considered to be too expensive for use in treating poultry. 4,898 specimens from 1,864 cases were examined at the poultry pathological laboratory, Petaluma.

A total of 6,346,868 animals were slaughtered for food.—J. A. GRIFFITHS.

U.S.A., STATE OF CALIFORNIA. (1944.) Department of Agriculture. [Report of] Division of Animal Industry. [DUCKWORTH, C. U.]—Bull. Calif. Dep. Agric. 33. 323-348. 1024

TUBERCULOSIS eradication is carried out by the United States Bureau of Animal Industry co-operating with the State Animal Industry Division. All the counties are modified accredited tuberculosis-free areas but in most of them the number of reactors is far below 0.5%. In the 716,720 cattle tested the reactors were less than 0.18%. Dairy cattle areas are continuously tested. Beef herds are tested if lesions are found in animals slaughtered. Reactors found in tests by veterinary practitioners are reported to district supervising veterinarians. The reactors are ear-tagged and

sent for slaughter. If lesions are found the herds of origin are tested.

A voluntary control scheme was continued for BRUCELLOSIS. Blood samples are taken by veterinary practitioners and the agglutination tests are made at the State Veterinary Laboratory. Strain 19 vaccine is being used for vaccinating calves. Sixty-one of 154 herds in the control scheme are free from the disease. This amounts to 62.76% of the 8,210 cattle tested.

There were 171 outbreaks of SWINE FEVER. Of these 154 were on ranches where the pigs were fed on swill (garbage), seven on grain feeding ranches and six in stockyard or slaughter house pens.

BOVINE BACILLARY HAEMOGLOBINAEMIA due to *Clostridium haemolyticus* is spreading to new areas. Twelve outbreaks occurred. The use of vaccine prevents outbreaks and controls the disease. Death is rapid and losses are heavy in infected herds.

An outbreak occurred of MALIGNANT OEDEMA in which *Clostridium septique* was isolated from all the infected animals. The outbreak was controlled by vaccination with bacterin. Two animals died within 48 hours of vaccination.

Molybdenum poisoning occurred in dairy heifers. The symptoms of the disease were chronic emaciation following scours and some bone derangement. The black colour of the Holstein heifers faded to a mousey colour. Analyses of fodder and organs of animals show an excess of molybdenum. When the herd was moved to another part of the State they improved.

JAUNDICE IN CATTLE occurred, characterized by symptoms including generalized icterus, anaemia, loss of appetite and emaciation, peeling muzzles, and in the more severe cases a discharge of pus from eyes and nose. No organism could

be found. Klamath weed made up a large part of the diet.

Nervous and muscular symptoms were noted again during the year in the summer and autumn months among animals feeding on rye and dallis grass pastures and were ascribed to X DISEASE of cattle and sheep. The cause is thought to be due to ergot or other fungus. The disease is noted on both non-irrigated and irrigated rye grass pastures. Feeding hay in addition to pasture does not entirely prevent the disease.

EQUINE ENCEPHALOMYELITIS was widespread in the summer and autumn months. There were 208 cases. Vaccination prevented greater losses.

In lambs SHIPPING FEVER, HAEMORRHAGIC SEPTICAEMIA or PNEUMO-ENTERITIS occurred. The condition was an important cause of losses among lambs being sent into the State from other States. In some cases *Pasteurella oviseptica* was isolated, in others only streptococci, staphylococci and *Bacterium coli*. In one outbreak a salmonella organism was recovered.

An effort has been made to verify the presence of PULLORUM DISEASE in reactors to the test before condemning the flock as infected.

There is an animal pathological laboratory at Sacramento which provides a general diagnostic service, mainly poultry disease diagnosis, does agglutination tests for brucellosis and water analyses for the Meat Inspection Service.

The poultry pathological laboratories at Petaluma and Los Angeles concentrate on poultry disease diagnosis. No significant change in the incidence of poultry diseases has been noted.

During 1944 there were 6,952,843 animals slaughtered in California in approved establishments under federal, state or state approved meat inspection systems.—J. A. GRIFFITHS.

## BOOK REVIEWS

GRÜNEBERG, H. [Ph.D., M.D. Reader in Genetics, University College, London. Late Research Student of the Royal Society]. (1947.) **Animal genetics and medicine.** pp. xii + 296. Numerous figs. and refs. London: Hamish Hamilton Medical Books. 21s. 1025

This book is not a textbook of theoretical genetics, its object is to act as a link between medicine and the science of genetics. The first two chapters are short and deal with the basic concepts of inherited disease and the influence of environment on the development of inherited tendencies. The distinction between "congenital" and "inherited" disease is drawn. A congenital condition need not necessarily be inherited while on the other hand an inherited defect may not be apparent at the time of birth.

The value of animals as experimental material in the study of inherited disease is made clear. Chapter III deals in detail with an inherited disease of the rat which is selected because the behaviour of the gene responsible has been clearly studied.

The remainder of the book deals with various inherited conditions classified according to the organs chiefly affected. There is a good bibliography and index.

To veterinarians the title is open to criticism as it suggests that genetics and inherited diseases of farm livestock are adequately dealt with. That is not the case; only conditions which occur in man and in laboratory animals and which have been the subject of genetical study are discussed at length. There is only passing reference to such conditions in domestic animals.—M. C.

WORDEN, A. N. [M.A. (Cantab.), B.Sc. (Lond.), M.R.C.V.S., A.R.I.C. Milford Professor and Director of Research in Animal Health, University College of Wales]. (1947.) **The UFAW handbook on the care and management of laboratory animals.** pp. xvi + 368. London : Baillière, Tindall & Cox. 70 illustrations. 31s. 6d.

1026

This book is an encyclopaedia on laboratory animal management. The subject matter has been prepared by experts on the care and management of the different species of animals used in laboratories. It will definitely rank as a reference book on the subject.

The first chapter is very properly devoted to the "rights of laboratory animals" and the fact that a chapter of this nature, written with such obvious sympathy and understanding, is included in a work of this kind should have marked educational value among that section of the community which is antagonistic to vivisection.

The second chapter gives some very practical advice on the construction and running of the animal laboratory. The importance of the right assistant is emphasized. Too often the small animal attendant is chosen because of his lack of ability to take on other supposedly more technical work and the editor does well to emphasize this point. At the same time one feels that this book is perhaps too technical and advanced for many animal attendants. It does require careful study in many instances to sift out the best methods and if a simplified and condensed version were prepared it would be of great value, not only to many laboratory attendants, but also to those who breed small animals either for their own interest or for sale. Many references to further points in management and vitamin requirements, etc., are given throughout the work, and while such references are of great value to the scientist, they are in such profusion in this work that they may confuse and intimidate the average laboratory animal technician. The editor has assembled some very useful information on technique including anaesthesia and euthanasia. On page 70 a paragraph on the water requirements of the rabbit should prove of great value and many breeders will note the importance of "an adequate allowance of concentrated foods". Each article, however, is full of such practical points.

The subject of "pests of the animal house and their control" is very fully dealt with in Chapter III; Chapters IV to XXII deal with the rabbit, the guinea-pig, the Norway rat, the black rat, the mouse, the wild house mouse, the wood mouse, deer mice, the cotton rat, the common or field vole, the Orkney vole, the golden hamster, the ferret, the hedgehog, the pigeon, the canary,

amphibia (frogs, toads, salamanders, newts, axolotls, and *Xenopus laevis*), and fresh water fish. The information in these chapters is very complete and the sections on diseases should prove invaluable.

Chapter XXIII indicates sources from which information regarding other animals used in experiments such as anthropoid apes, dogs and cats, horses, poultry, etc., may be obtained.

The appendix "a conspectus of the elements of statistical analysis" is supplied by HUME and has certainly brought out clearly the value of the statistical approach, not only in effecting economies in the numbers of animals used in experiments but, what is equally important, in having an adequate number of animals. The book is well illustrated and turned out and it should be read by everyone using animals for research purposes.—H. G. LAMONT.

FISHWICK, V. C. [Pig Husbandry Research Station, Southeastern Agricultural College, University of London]. (1946.) **Pigs, their breeding, feeding and management.** pp. 222. Numerous plates and diagrams. London : Crosby Lockwood & Son, Ltd. [Revised Edit. 12s. 6d.]

1027

A third reprinting of this book, which was revised in 1945, has now appeared. The basis of the subject matter is the author's own experience of practical pig husbandry with comments on some of the alternative method employed elsewhere.

Chapter I discusses the rearing of young pigs and provides experimental evidence to show the importance of the early stages in the pig's life. The next two chapters deal with management of pigs for bacon and pork respectively. Chapter IV deals with breeding and discusses the importance of pedigree stock. This is followed by a chapter on "some matters of policy" dealing amongst other things with the choice of breeds, the value of crossing, the various systems of management applicable to different farming methods and ending with a very useful method of drawing up a working programme of herd management. Chapter VI deals with the housing of pigs and should be read in conjunction with the appendices which give detailed instructions on erection of buildings. Health and diseases are briefly discussed in Chapter VII, and Chapter VIII is a comprehensive account of pig feeding. The final chapter on "cash and returns", which appeared first in the revised edition in 1945, is a most valuable addition for the prospective pig keeper.

The book is well illustrated with excellent photographs, and under housing, there are some useful diagrams.

For those interested, whether experienced or inexperienced, this is a thoroughly practical and readable book on the breeding, feeding and management of pigs.

WHITLOCK, J. H. [Assistant Professor of Parasitology, New York State Veterinary College, Cornell University]. (1947.) **Illustrated laboratory outline of veterinary entomology and helminthology.** pp. 87. 31 plates. Minneapolis: Burgess Publishing Co. [Mimeographed.] \$ 3.00.

1028

This booklet forms the first part of a laboratory guide to veterinary parasitology to be published in two parts. The common arthropod and helminth parasites of the domesticated animals are covered. The approach is taxonomic, with the object of training the student in the use of taxonomic principles in the identification of parasites. The classification used is unorthodox in many respects, having been simplified for practical use without undue respect for theoretical considerations; it is, however, adequate for a body of students not primarily concerned with systematics.

The extensive series of plates has been collected from many standard text-books, redrawn as necessary to achieve uniformity, and the student is invited to label these from his laboratory observations. The avowed object is to save "valuable laboratory time", but it may be doubted whether this may not be at the expense of soundness. It will be the opinion of most laboratory teachers that, valuable as standard drawings may be, they should be supplemented by the student's own efforts: however inadequately recorded, the individual's own impression of the appearance of an actual specimen will be of greatest value in identifying field material, which has a disconcerting knack of resembling not at all its text-book counterpart.

The format of the book, however, offers its own solution to the problem. One side of every page is blank and can be used for additional notes and drawings. As the quality of the paper is excellent for both writing and drawing, the conscientious student could make a most valuable personal record of his laboratory findings, set item by item beside a sound general outline of the subject.

The book is bound in the spiral wire loose leaf system which will facilitate alterations in later editions. Comment and criticism are therefore freely invited.—E. M. S.

I. HASSALL, A., DOSS, M. A., SEGAL, D. B., & CARSON, G. B. (1946.) **Index-catalogue of**

**medical and veterinary zoology. Part 7.**

**Authors : H to Juzuki.** pp. 1755-2271. Washington, D.C.: Superintendent of Documents. 8vo. \$1.25.

1029

II. HASSALL, A., DOSS, M. A., SEGAL, D. B., CARSON, G. B., & RAY, D. H. (1946.) **Index-catalogue of medical and veterinary zoology. Part 8.** Authors : K to Kyzer. pp. 2273-2582. Washington, D.C.: Superintendent of Documents. 8vo. 55 cents.

1030

III. HASSALL, A., DOSS, M. A., SEGAL, D. B., & RAY, D. H. (1946.) **Index-catalogue of medical and veterinary zoology. Part 9.** Authors : L to Lyutkevich. pp. 2583-2966. Washington, D.C.: Superintendent of Documents. 8vo. 70 cents.

1031

After a four-year break imposed by wartime economy, publication of this most valuable series has been resumed. The very high standard of completeness and accuracy has been maintained. References for 1943 and some for 1944 are included.—E. M. SINCLAIR.

KLYNE, W. [M.A., B.Sc. (Oxon.), Lecturer in Biochemistry, University of Edinburgh]. (1946.)

**Practical chemistry for medical students.** pp. xvi + 460. Numerous figs. & tables. Edinburgh: E. & S. Livingstone, Ltd. 8vo. 20s.

1032

From long experience of teaching pre-medical and first year medical students, the author has set out to produce a book, suitable not only for the practical chemistry class but also containing sufficient theoretical material to give the student a clear understanding of the underlying principles involved in the various tests and manipulations he has to perform. In this the author has been eminently successful and the book is a welcome contribution to the subject of chemistry.

The book is divided into five parts. Parts 1 and 2 deal with the general principles of scientific methods and the use of simple laboratory apparatus. Part 3 deals with the general principles of chemistry, volumetric analysis and physical chemistry, particular attention being paid to the ionic theory. Part 4 deals with the more important inorganic substances and their detection. Part 5 deals with organic chemistry with special reference to compounds of biological importance.

Whilst the book contains a great deal more material than could be conveniently included in one year's work, nevertheless it can be highly recommended to veterinary students and might well be adopted as the standard work for the first year's chemistry course.—J. A. NICHOLSON.

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The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

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